REPORT NO. 53 MAY, 1931

DEPARTMENT OF AGRICULTURE
GOVERNMENT RESEARCH INSTITUTE
FORMOSA, JAPAN

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APHIDIDAE OF FORMOSA

PART 6

BY

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PUBLISHED BY THE INSTITUTE
TAIHOKU, FORMOSA

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APHIDIDAE OF FORMOSA.—Vi.

By

Ryoichi TAKAHASHI

Introduction.

The plant lice, or aphids, are not only a very important group of insects because of the serious damage they cause to many of our economic plants, but they are also of great interest because of their habits and modes of life; and I began the study of these insects in Formosa in 1920. Up to that time only about 25 injurious species had been described from this region by Prof. S. Matsumura (1910, 1917), Dr. T. Shiraki (1913), Mr. M. Maki (1915–1919), and the late Mr. I. Nitobe (1916), but the biology of the group had received no attention in the island.

During the past 10 years I have continued to describe many new forms and have also published the results derived from my observations on the biology of these insects, on the morphology of their immature stages and on their natural enemies in the reports of the Department of Agriculture of the Government Research Institute, Formosa, and in various other papers scattered in several periodicals.

In this contribution an attempt has been made to bring together the species now known to occur in Fotmosa[1], arranging them in a systematic scheme, with notes on some species and genera, and giving an account of their economic aspects and phylogeny, while a newly compiled food-plant catalogue has been appended. A certain amount of confusion and misidentification has been found in my previous works and it has in consequence been necessary to make some corrections.

At present a total of about 200 species belonging to 62 genera are known in Formosa, of which 5 are new to science.

The aphids (the superfamily Aphidoidea) are here divided into 2 families[2],

(1) The author regrets that unfortunately some species are as yet known from the apterous form only and also that a few species can not be included in this paper, since they are represented by incomplete or inadequate specimens in our collection.

(2) Boerner divides the aphids into 4 families, but I believe it is more rational and suitable to divide the existing forms into the 2 families. The family Genaphididae is also included in the superfamily Aphidoidea, but it is represented by a fossil species only.

namely Aphididae and Phylloxeridae. The family Phylloxeridae is represented in Formosa by only one species, *Pineus* sp., of the subfamily Adelginae, which is common on *Pinus* in the spring in Taihoku, and is closely allied to *Pineus strobi* Hart., but has not been determined, since the winged form has not been discovered, and it is not dealt with in this paper.

The phylogeny of the family Aphididae seems to be very complicated, and various systems of classification have been proposed by Baker, Boerner, Oestlund, Mordvilko, Swain, Theobald, van der Goot, Wilson and the writer. I am now inclined to believe that Mordvilko's view interpreted in his several papers is most rational, but the system adopted here is different from his, and discussions will be made later. In the present paper 6 subfamilies are recognized,—namely, Lachninae, Greenideinae, Aphidinae, Agrioaphidinae (syn. Callipterinae), Thelaxinae, and Eriosomatinae.

The dermal characters are a fundamental basis for classification in the Coccidae and are also very important in the Aleyrodidae and Chermidae (Psyllidae), but have been rather neglected in the Aphididae, although they furnish sufficient basis for specific and generic determination in some groups in this family, too, and I have paid special attention to them.

The food plants given in this paper are only those which have been observed by me to be utilized by these insects in Formosa alone. A greater number of species are now known from Taihoku than from other localities in the island, but this is because of the greater thoroughness with which specimens have been collected in this region. All the type specimens will be preserved in the collection of the Department of Agriculture of the Government Research Institute, Formosa.

This work could not have been accomplished were it not for the invaluable assistance received from Prof. T. Shiraki and many other entomologists in this country and abroad, and I acknowledge my deep gratitude to them all. I am also very much indebted to Prof. C. R. Kellogg of Fukien, China, who has kindly corrected errors in English in a part of the manuscript of this paper.

Economic aspects of the Formosan Aphididae.

The aphids are pests of great economic importance in all parts of the world. In Formosa they comprise some 200 species which attack about 285 species of plants under 192 genera, but fortunately the species destructive to our cultivated plants are relatively few in number.

Saccharum officinarum, an outstanding crop in Formosa, is attacked by 5

species as shown in the food-plant catalogue accompanying this paper, of which *Ceratovacuna lanigera* Zehnt. (syn. *Oregma lanigera* Zehnt.) is the chief pest, at times causing serious damage. As no parasites of the pest were detected in Formosa, the parasite, *Encarsia flavoscutellum* Zehnt., was introduced from Java by Messrs. M. Ishida and S. Takano, but the results have not yet proved to be satisfactory. Another important pest of sugar cane is *Tetraneura radicicola* Strand, which occured in large numbers on the roots of this plant in the eastern part of the island years ago. The remaining species seem to be of no great importance so far as sugar cane is concerned, although *Aphis sacchari* Zehnt. is a serious pest of *Sorghum* in Formosa and Hokoto (Pescadores Islands).

Aphis maidis Fitch does not occur on sugar cane in Formosa, whereas it is said to attack this plant in some countries. *Oryza sativa* is rarely attacked by some aphids, the injury being slight. *Citrus* is infested by 3 aphids:—*Aphis citricidus* Kirk. (syn. *A. tavaresi* Del Guercio), which is the only aphis confined almost entirely to *Citrus* in the island, sometimes occurring abundantly, while the remaining 2 species are polyphagous, feeding on various plants. *Megoura citricola* van der Goot described from *Citrus* in Java is common on various plants, occassionally killing the branches of *Cinnamomum camphora*, but has not been found on *Citrus* in our island.

It is a very remarkable fact that the tropical fruit plants which are evergreen are entirely free from the attacks of these insects or slightly injured by a few species, while the deciduous fruit trees are the favoured hosts of many aphids. *Musa sapientum* is attacked by *Pentalonia nigronervosa* Coq., but suffers very slightly in the fields; *Ananas comosus* and *Carica papaya* are entirely free from these insects, and *Mangifera indica* and *Euphoria longana* are attacked by *Greenidea mangiferae* Takah., the injury, however, being not serious, while various plants of *Prunus* are infested by *Myzus varians* David., *M. momonis* Mats., *Hyalopterus arundinis* Fab., and some other species (see the food-plant catalogue).

Aphis gossypii Glov. and *Myzus persicae* Sulz. are common on various plants, including several vegetables, but are usually not found on evergeen trees, and the latter species rarely occurs on *Ipomaea batatas* in small numbers. *Brassica*, *Raphanus* and *Papaver somniferum* are severely infested by *Rhopalosiphum pseudobrassicae* Davis, but *Brevicoryne brassicae* L. is extremely scarce in our island. *Macrosiphum pisi* Kalt., *M. granarium* Kirby, *Aphis pomi* De Geer, *Rhopalosiphum prunifoliae* Fitch and several other species are very harmful in Japan proper and other countries, but are of no great importance in our island. The famous aphid pests, *Eriosoma lanigerum* Hausm. and *Phylloxera vastatrix* Planch., are not found

in Formosa, where the apple, the host of the former species, does not grow, although a plant of *Malus* is found in the mountainous regions, and the grape, the host of the latter, is cultivated.

The aphids attacking cultivated plants in Formosa may be grouped as follows:

(1) Those species which are tropical or subtropical, attacking the tropical plants which are evergreen and usually possess hard leaves.

a. Those species found in all tropical and subtropical countries.

Aphis citricidus Kirk., *Toxoptera aurantii* Boyer, *Pentalonia nigronervosa* Coq. and *Cerataphis lataniae* Boisd. belong to this category. They are apparently introduced species.

b. Those species known only from Formosa and the neighbouring territory.

Megoura citricola van der Goot, *Greenidea mangiferae* Takah., *Ceratovacuna lanigera* Zehnt., etc. are the examples of this group.

(2) Those species which are temperate, rarely attacking the evergreen trees (excepting the Coniferae). The species of this category far outnumber those of the other.

a. Those species distributed over most of the world.

Aphis gossypii Glov., *A. laburni* Kalt., *A. maidis* Fitch, *Myzus persicae* Sulz., *Rhopalosiphum pseudobrassicae* Davis, *R. nymphaeae* L., *Hyalopterus arundinis* Fab., etc. are included in this group. They are no doubt immigrants and some of them are extremely polyphagous, being very injurious in almost all the countries where they occur.

b. Those species found only in Formosa and the neighbouring territory.

Macrosiphum gobonis Mats., *M. formosanum* Takah., *Amphorophora oleraceae* van der Goot, *Myzus momonis* Mats., *Aphis petasiticola* Takah., *Brachycolus heraclei* Takah., *Fullawayella formosana* Takah., *Neophyllaphis podocarpi* Takah., *Tetraneura radicicola* Strand, etc. belong to this category.

From the above account it is evident that the aphids attacking cultivated plants in Formosa include various components and are, for the most part, not endemic to the island, comprising many imported species.

The aphids are essentially a group of insects of the temperate zone and have penetrated into the tropics secondarily, as has been discussed by Mordvilko; and for this reason the species adapted to the tropical plants, which are evergreen and possess hard leaves, are fewer, and hence the tropical trees, including the fruit

trees, are attacked by a few species or are entirely free from these insects as mentioned already. As will be seen from the food-plant catalogue the hosts favoured by these insects in our island include many deciduous or herbaceous plants.

It is very noticeable that in the aphid fauna of Formosa, as in that of Java (van der Goot), the subfamilies Greenideinae and Thelaxinae include numerous species, while the subfamily Eriosomatinae is represented by only a few members, although in Japan proper the former 2 groups have a few species and the last-named subfamily includes many important pests.

The aphids of the Greenideinae usually attack various wild trees and are of no economic importance, and those of the Thelaxinae include some important pests (*Ceratovacuna lanigera* Zehnt. and some species of *Oregma* infestng bamboo), while the Eriosomatinae contain a few pests (*Tetraneura hirsuta* Baker, *T. radicicola* Strand, etc.). Most of the species injurious to our cultivated plants belong to the subfamily Aphidinae, which must be, hence, regarded as the most important from an economic standpoint.

The aphids are for the most part injurious pests, but a few species produce useful galls. In Formosa the galls of *Melaphis chinensis* Bell are not uncommon on *Rhus* in the mountainous districts in the eastern part. The dried galls contain over 54 per cent of tannin according to the analysis by Mr. O. Okumura and may be utilized for manufacturing tannin, but at present they are not being put to any use.

It is a well known fact that some aphids transmit virus diseases of plants, but in Formosa no such species are now recorded.

Various contact insecticides are recommended for control of these insects. In Formosa spraying with derris solution is most convenient and is widely practiced for control, since it is very effective, not expensive, does not injure the plants, and the solution may be easily prepared. The Formosan derris, *Millettia taiwaniana*, grows wild in the mountainous regions and may be easily cultivated also.

The following food-plant catalogue is intended to include all the plants now known to be attacked by these insects in Formosa alone. The names of the plants are arranged alphabetically.

Food plant catalogue of the Formosan Aphididae.

Abelmoschus moschatus.
- Aphis gossypii Glov.
- Myzus persicae Sulz.

Acanthopanax trifoliatum.
- Aphis gossypii Glov.

Acer sp.
- Drepanaphis sauteri Takah.
- Myzus persicae Sulz.
- Periphyllus formosanus Takah.

Actinodaphne pedicellata.
- Aiceona actinodaphnis Takah.

Aeschynomene indica.
- Aphis laburni Kalt.

Agalma lutchuense.
- Aphis odinae van der Goot.
- Cavariella araliae Takah.

Ageratum conyzoides.
- Anuraphis helichrysi Kalt.

Allium spp.
- Fullawayella formosana Takah.

Alnus formosana.
- Agrioaphis pseudoalni Takah.

Alopecurus aequalis.
- Macrosiphum granarium Kirby.
- Tetraneura hirsuta Baker.

Alpinia speciosa.
- Pentalonia nigronervosa Coq.

Antirrhinum majus.
- Myzus persicae Sulz.

Anona sp.
- Toxoptera aurantii Boyer.

Apium graveolens.
- Brachycolus heraclei Takah.

Arachis hypogaea.
- Aphis laburni Kalt.

Aralia spp.
- Cavariella araliae Takah.

Arctium lappa.
- Acyrthosiphon cirsicola Takah.
- Macrosiphum gobonis Mats.

Ardisia sieboldii.
- Toxoptera aurantii Boyer.

Areca spp.
- Cerataphis lataniae Boisd.

Artemisia capillaris.
- Amphorophora neoartemisiae Takah.
- Cryptosiphum gallarum Kalt.
- Macrosiphoniella formosartemisiae Takah.
- Micraphis artemisiae Takah.

Artemisia vulgaris var. indica.
- Aphis kurosawai Takah.
- Capitophorus formosartemisiae Takah.
- Cryptosiphum gallarum Kalt.
- Macrosiphoniella yomogifoliae Shinji.
- Rhopalosiphum lahorensis Das.

Arthraxon ciliaris.
- Ceratovacuna orientalis Takah.
- Myzus arthraxonis Takah.

Arundinaria spp.
- Aphis bambusae Full.
- Monellia formosana Takah.
- Oregma pseudomontana Takah.
- Oregma tattakana Takah.

Asclepias curassavica.
- Aphis nerii Boyer.

Astilbe longicarpa.
- Myzus montanus Takah.

Astragalus sinicus.
- Aphis laburni Kalt.

Bambusa spp.
Agrioaphis bambusicola Takah.
Agrioaphis bambusifoliae Takah.
Agrioaphis taiwanus Takah.
Aphis bambusae Full.
Cerataphis bambusifoliae Takah.
Ceratoglyphina bambusae van der Goot.
Ceratovacuna longifila Takah.
Oregma bambusicola Takah.
Oregma koshunensis Takah.
Oregma pseudomontana Takah.
Oregma suishana Takah.
Phyllaphoides bambusicola Takah.
Trichoregma bambusifoliae Takah.
Bidens pilosa.
Anuraphis helichrysi Kalt.
Aphis gossypii Glov.
Aphis malvoides van der Goot.
Bischoffia javanica.
Aphis odinae van der Goot.
Blumea spp.
Aleurodaphis blumeae van der Goot.
Anuraphis formosanus Takah.
Aphis gossypii Glov.
Macrosiphum gobonis Mats.
Boehmeria sp.
Myzus boehmeriae Takah.
Bougainvillaea spectabilis.
Aphis gossypii Glov.
Brassica spp.
Brevicoryne brassicae L.
Myzus persicae Sulz.
Rhopalosiphum pseudobrassicae Davis.
Breynia sp.
Aphis gossypii Glov.
Bridelia spp.
Greenidea brideliae Takah.
Megoura citricola van der Goot.
Caladium sp.
Toxoptera aurantii Boyer.
Callicarpa formosana.
Aphis gossypii Glov.
Campanumoea javanica.
Myzus taiwanus Takah.
Capsella bursapastoris.
Myzus persicae Sulz.
Rhopalosiphum pseudobrassicae Davis.
Castanopsis spp.
Eutrichosiphum lithocarpi Maki.
Paratrichosiphum tattakanum Takah.
Paratrichosiphum tenuicorpus Okaj.
Castanea formosana.
Paratrichosiphum tattakanum Takah.
Casuarina equisetifolia.
Aphis gossypii Glov.
Celtis sinensis.
Shivaphis celti Das.
Chenopodium album.
Hyalopterus atriplicis L.
Myzus persicae Sulz.
Chrysanthemum coronarium.
Macrosipum gobonis Mats.
Rhopalosiphum pseudobrassicae Davis.
Chrysanthemum sinensis.
Aphis gossypii Glov.
Capitophorus formosanus Takah.
Macrosiphoniella sanborni Gillette.
Macrosiphoniella yomogifoliae Shinji.
Rhopalosiphum lahorensis Das.
Chrysanthemum sp.
Myzus persicae Sulz.
Cinnamomum camphora.
Megoura citricola van der Goot.

Cirsium spp.
- Acyrthosiphon cirsicola Takah.
- Capitophorus braggii Gillette.
- Capitophorus montanus Takah.
- Macrosiphum gobonis Mats.

Citrullus vulgaris.
- Aphis gossypii Glov.

Citrus spp.
- Aphis citricidus Kirk.
- Aphis odinae van der Goot.
- Toxoptera aurantii Boyer.

Clematis spp.
- Eriosoma clematicola Takah.
- Macrosiphum clematidis Takah.
- Myzus varians David.

Clerodendron spp.
- Aphis gossypii Glov.

Cocos nucifera.
- Cerataphis formosanus Takah.
- Cerataphis lataniae Boisd.

Coffea arabica.
- Toxoptera aurantii Boyer.

Colocasia spp.
- Aphis gossypii Glov.

Coriandrum sativum.
- Brachycolus heraclei Takah.

Cryptotaenia canadensis.
- Brachycolus heraclei Takah.

Cucumis sativus.
- Aphis gossypii Glov.

Cynodon dactylon.
- Pemphigella aedificator Buckt.

Cyperus spp.
- Geoica lucifuga Zehnt.
- Vesiculaphis caricis Full.

Daucus carota.
- Brachycolus heraclei Takah.

Dendrocalamus latiflorus.
- Agrioaphis bambusicola Takah.
- Oregma alexanderi Takah.
- Trichoregma bambusifoliae Takah.
- Trichoregma insularis van der Goot.

Drosera lourerii.
- Aphis droserae Takah.

Duranta plumieri.
- Myzus persicae Sulz.

Dryopteris arida.
- Myzus polypodicola Takah.

Ehretia buxifolia.
- Toxoptera aurantii Boyer.

Elaeagnus spp.
- Capitophorus braggii Gillette.
- Lachniella niitakayamensis Takah.

Elaeocarpus japonicus.
- Eutrichosiphum lithocarpi Maki.

Eleusine indica.
- Tetraneura hirsuta Baker.

Emilia sonchifolia.
- Aphis malvoides van der Goot.

Eriobotrya sp.
- Aphis gossypii Glov.

Eucalyptus sp.
- Aphis gossypii Glov.

Eupatorium formosanum.
- Anuraphis helichrysi Kalt.

Euphoria longana.
- Greenidea mangiferae Takah.

Evodia triphylla.
- Macrosiphum evodiae Takah.

Fagus hayatae.
- Phyllaphis sp.

Ficus spp.
- Aphis gossypii Glov.
- Aphis odinae van der Goot.

Greenidea ficicola Takah.
Megoura citricola van der Goot.
Thoracaphis fici Takah.
Toxoptera aurantii Boyer.

Gardenia florida.
Toxoptera aurantii Boyer.

Glochidion spp.
Aphis pomi De Geer.
Setaphis formosanus Takah.

Glycine spp.
Aphis gossypii Glov.
Aphis laburni Kalt.

Gnaphalium spp.
Aphis gossypii Glov.
Macrosiphum gobonis Mats.

Gossypium sp.
Aphis gossypii Glov.

Hemerocallis spp.
Amphorophora indica van der Goot.
Myzus hemerocallidis Takah.

Heracleum sp.
Brachycolus heraclei Takah.

Hibiscus spp.
Aphis gossypii Glov.
Myzus persicae Sulz.

Hordeum sativum.
Aphis maidis Fitch.

Humulus japonicus.
Phorodon humuli Schr.

Ipomaea batatas.
Myzus persicae Sulz.

Ixora chinensis.
Aphis gossypii Glov.

Jussiaea erecta.
Aphis pomi De Geer.

Justicia procumbens.
Aphis gossypii Glov.

Lactuca spp.
Amphorophora oleraceae van der Goot.
Aphis gosypii Glov.
Macrosiphum debilis Takah.
Macrosiphum formosanum Takah.
Macrosiphum lactucicola Strand.
Myzus persicae Sulz.

Lagerstroemia spp.
Agrioaphis kahawaluokalani Kirk.

Lasianthus sp.
Megoura citricola van der Goot.

Leersia hexandra.
Brachysiphoniella graminis Takah.

Leonurus sibiricus.
Aphis gossypii Glov.

Limnanthemum indicum.
Rhopalosiphum nymphaeae L.

Lindera glauca.
Aiceona actinodaphnis Takah.

Liquidambar formosana.
Aphis gossypii Glov.
Longistigma liquidambarus Takah.
Stomaphis liquidambarus Takah.

Lithocarpus spp.
Eutrichosiphum lithocarpi Maki.
Greenidea nigra Maki.
Paratrichosiphum dubium van der Goot.
Paratrichosiphum lithocarpi Takah.
Paratrichosiphum nigrofasciatum Maki.
Paratrichosiphum tenuicorpus Okaj.
Thoracaphis lithocarpi Takah.
Thoracaphis takahashii Strand.

Lonicera japonica.
Trichosiphonaphis polygoniformosanus Takah.

Macaranga tanarius.
Toxoptera aurantii Boyer.

Machilus spp.
  Phyllaphis machili Takah.
  Thoracaphis formosanus Takah.
Mahonia morissonensis.
  Amphorophora viburni Takah.
Malus formosanus.
  Myzus malisuctus Mats.
Mangifera indica.
  Greenidea mangiferae Takah.
Melastoma candidum.
  Aphis gossypii Glov.
Meliosma spp.
  Paratrichosiphum taiwanum Takah.
Mentha arvensis.
  Phorcdon menthae Buckt.
Michelia longifolia.
  Formosaphis micheliae Takah.
Mikania sp.
  Aleurodaphis mikaniae Takah.
Milletia reticulata.
  Acyrthosiphon formosanum Takah.
Miscanthus spp.
  Aphis sacchari Zehnt.
  Ceratovacuna lanigera Zehnt.
  Macrosiphum granarium Kirby.
  Macrosiphum smilacifoliae Takah.
  Oregma alexanderi Takah.
  Tetraneura hirsuta Baker.
  Tetraneura radicicola Strand.
Morus alba.
  Toxoptera aurantii Boyer.
Murraya exotica.
  Megoura citricola van der Goot.
  Toxoptera aurantii Boyer.
Musa spp.
  Pentalonia nigronervosa Coq.
Myrica rubra.
  Acyrthosiphon pisi Kalt.
  Greenidea myricae Takah.
Nelumbo nucifera.
  Rhopalosiphum nymphaeae L.
Nerium indicum.
  Aphis nerii Boyer.
  Myzus persicae Sulz.
Nicotiana tabacum
  Myzus persicae Sulz.
Nymphaea sp.
  Rhopalosiphum nymphaeae L.
Oenanthe stolonifera.
  Brachycolus heraclei Takah.
Oplismenus spp.
  Ceratovacuna orientalis Takah.
  Pemphigella aedificator Das.
Oryza sativa.
  Aphis maidis Fitch.
  Macrosiphum granarium Kirby.
  Tetraneura hirsuta Baker
Ourouparia formosana.
  Aphis gossypii Glov.
Paederia tomentosa.
  Acyrthosiphon paederiae Takah.
Palmae (a plant of the family).
  Trichoregma rhapidis van der Goot.
Panicum spp.
  Oregma panicola Takah.
Papaver somniferum.
  Myzus persicae Sulz.
  Rhopalosiphum prunifoliae Fitch.
  Rhopalosiphum pseudobrassicae Davis.
Perilla ocymoides.
  Acyrthosiphon perillae Takah.
  Aphis gossypii Glov.
Petasites spp.
  Acyrthosiphon cirsicola Takah.

Aphis petasiticola Takah.
Capitophorus takahashii Strand.
Myzus persicae Sulz.

Phragmites spp.
Aphis bambusae Full.
Hyalopterus arundinis Fab.

Phyllostachys makinoi.
Phyllaphoides bambusicola Takah.

Pinus spp.
Cinara formosana Takah.
Cinara orientalis Takah.
Cinara pineti Koch.
Cinara pinidensiflorae Essig et Kuw.
Eulachnus piniformosanus Takah.
Eulachnus rileyi Willms.
Unilachnus orientalis Takah.

Pirus serotina.
Aphis gossypii Glov.
Aphis pomi De Geer.
Nippolachnus piri Mats.
Toxoptera piricola Mats.

Pistia stratiotes.
Rhopalosiphum nymphaeae L.

Pisum spp.
Acyrthosiphon pisi Kalt.
Aphis laburni Kalt.
Myzus persicae Sulz.

Pittosporum tobira.
Aphis odinae van der Goot.
Toxoptera aurantii Boyer.

Plantoga major.
Myzus plantagicola Takah.

Podocarpus spp.
Neophyllaphis podocarpi Takah.

Pollia japonica.
Acyrthosiphon takahashii Mason.

Pollinia ciliata.
Pemphigella aedificator Buckt.

Polygonum spp.
Aphis odinae van der Goot.
Capitophorus hippophaes Koch.
Myzus formosanus Takah.
Myzus persicae Sulz.
Trichosiphonaphis polygoniformosanus Takah.

Polypodium elliptica.
Fullawayella katoi Takah.

Polystichum spp.
Myzus polypodicola Takah.
Myzus woodwardiae Takah.

Portulaca oleracea.
Aphis gossypii Glov.

Pothos seemanni.
Cerataphis lataniae Boisd.

Prunus spp.
Anuraphis helichrysi Kalt.
Hyalopterus arundinis Fab.
Myzus momonis Mats.
Myzus mushaensis Takah.
Myzus persicae Sulz.
Myzus varians David.
Rhopalosiphum nymphaeae L.
Rhopalosiphum prunifoliae Fitch.

Psidium guyava.
Aphis gossypii Glov.
Greenidea formosana Maki.
Myzus persicae Sulz.

Punica granatum.
Aphis gossypii Glov.

Quercus spp.
Cervaphis quercus Takah.
Greenidea kuwanai Perg.
Greenidea mushana Takah.
Greenidea nigra Maki.

Greenidea quercifoliae Takah.
Paratrichosiphum dubium van der Goot.
Paratrichosiphum nigrofasciatum Maki.
Paratrichosiphum sp.
Paratrichosiphum tattakanum Takah.
Paratrichosiphum tenuicorpus Okaj.
Thoracaphis cuspidatae Essig et Kuw.
Thoracaphis quercicola Takah.
Thoracaphis takahashii Strand.
Tuberculoides querciformosanus Takah.
Tuberculoides pilosus Takah.

Ranunculus sceleratus.
Rhopalosiphum pseudobrassicae Davis.

Raphanus spp.
Myzus persicae Sulz.
Rhopalosiphum pseudobrassicae Davis.

Raphiolepis spp.
Nippolachnus piri Mats.

Rhododendron lasiostylum.
Macrosiphum itoe Takah.

Rhodomyrtus tomentosa.
Greenidea formosana Maki.

Rhus semialata.
Aphis odinae van der Goot.
Melaphis chinensis Bell.
Nurudea shiraii Mats.

Rosa spp.
Acyrthosiphon rosaefoliae Theob.
Macrosiphum ibarae Mats.

Rubus spp.
Macrosiphum rubiformosanum Takah.
Matsumuraja formosana Takah.
Matsumuraja rubicola Takah.
Matsumuraja rubifoliae Takah.

Rumex crispus.
Aphis rumicis L.

Saccharum officinarum.
Aphis sacchari Zehnt.
Ceratovacuna lanigera Zehnt.
Geoica lucifuga Zehnt.
Tetraneura hirsuta Baker.
Tetraneura radicicola Strand.

Sagittaria sagittifolia.
Rhopalosiphum nymphaeae L.

Salix spp.
Aphis gossypii Glov.
Aphis saliceti Kalt.
Cavariella bicaudata Essig et Kuw.
Cavariella japonica Essig et Kuw.
Cavariella neocapreae Takah.
Toxoptera aurantii Boyer.
Tuberolachnus saligna Gmelin.

Salvinia natans.
Rhopalosiphum nymphaeae L.

Sapindus mukorossi.
Agrioaphis insularis Takah.

Sapium sebiferum.
Aphis odinae van der Goot.

Saussurea affinis.
Macrosiphum gobonis Mats.

Schima sp.
Greenidea schimae Takah.

Scirpus lacustris.
Toxoptera scirpi Pass.

Scolopia crenata.
Toxoptera aurantii Boyer.

Sesamum indicum.
Myzus persicae Sulz.

Setaria spp.
Aphis maidis Fitch.
Macrosiphum granarium Kirby.

Siegesbeckia orientalis.
Myzus siegesbeckicola Strand.
Rhopalosiphum lahorensis Das.

Smilax spp.
Aphis smilacifoliae Takah.
Macrosiphum smilacicola Takah.
Macrosiphum smilacifoliae Takah.
Solanum melongena.
Aphis gossypii Glov.
Myzus persicae Sulz.
Solanum nigrum.
Aphis rumicis L.
Sonchus spp.
Amphorophora oleraceae van der Goot.
Macrosiphum formosauum Takah.
Solidago virga-aurea.
Macrosiphum lactucicola Strand.
Sorghum spp.
Aphis maidis Fitch.
Aphis sacchari Zehnt.
Stauntonia hebandra.
Anuraphis lanigera Takah.
Stellaria aquatica.
Myzus persicae Sulz.
Myzus stellariae Strand.
Styrax spp.
Astegopteryx jamuritsu Takah.
Astegopteryx styracicola Takah.
Astegopteryx styracophila Karsch.
Toxoptera aurantii Boyer.
Tectona grandis.
Aphis gossypii Glov.
Thea spp.
Megoura citricola van der Goot.
Toxoptera aurantii Boyer.
Thuja orientails.
Cinara thujafoliae Theob.
Trachelospermum jasminoides.
Eutrichosiphum minutum Takah.
Triticum vulgare.
Aphis maidis Fitch.
Rhopalosiphum prunifoliae Fitch.
Tsuga formosana.
Cinara taiwana Takah.
Viburnum spp.
Amphorophora viburni Takah.
Aphis odinae van der Goot.
Toxoptera aurantii Boyer.
Vicia fava.
Aphis laburni Kalt.
Viola sp.
Fullawayella violae Perg.
Vitis cantoniensis.
Greenidea viticola Takah.
Wendlandia paniculata.
Aphis odinae van der Goot.
Wikstroemia indica.
Aphis laburni Kalt.
Woodwardia spp.
Myzus woodwardiae Takah.
Zea mays.
Aphis maidis Fitch.
Aphis sacchari Zehnt.
Zelkova formosana.
Agrioaphis mushensis Takah.
Agrioaphis viridis Takah.
Myzus persicae Sulz.

Notes on the phylogeny of Aphididae.

The aphids (the superfamily Aphidoidea)[1] belong to the Sternorrhyncha,[2] a division of the suborder Homoptera. They are morphologically most related to the psyllids among the insects of the Sternorrhyncha, as has been discussed by Muir and others, but the psyllids, as we know them to-day, are too specialized to form the ancestors of the aphids. It is, however, evident that the ancestor of the aphids must be a psyllid-like insect. The study of Tillyard on the fossil, *Lophioneura ustulata* Tilly. (Lophioneuridae), from the Upper Permian, also tends to support this view, according to which the psyllids may be considered to be direct descendents of Lophioneuridae, as far as the forewing venation is concerned, and, from the same ancestral type represented by *Lophioneura*, the aphids can be quite simply derived, though in a different direction from the psyllids.

A considerable number of fossil aphids[3] have been described from the Tertiary (the Oligocene and the later periods), and only one species, *Genaphis waldensis* Brodie (Genaphididae), has been found in the Cretaceous (the Upper Jurassic), the stigmatic vein of which is apparently formed by the radial sector.

According to Patch, in the family Aphididae the stigmatic vein is the radial sector, while in the Phylloxeridae it is the media. *Genaphis*, then, must be considered as one of the ancestral types of the Aphididae, and if this assumption is correct, it is obvious that the Aphididae departed from the Phylloxeridae in the Cretaceous Period or still earlier.

The cornicles which so fundamentally separate aphids from all other insects are found in all of the major groups of the family Aphididae and are found well developed even in the more generalized forms, while they are lacking in some specialized ones; and, as has been stated by Hottes, it may be concluded that the cornicles only once arose in the family and were present in the immediate ancestral form of the family. According to Hottes the cornicles correspond morphologically

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(1) This superfamily is treated as a suborder of Homoptera by Handlirsch and as a distinct order (Aphidioptera) by Krausse and Wolff, but such systems are not adopted by other entomologists. Tillyard places the aphids in the superfamily Psylloidea of the Sternorrhyncha. The superfamily Aphidoidea includes Aphididae, Phylloxeridae and Genaphididae.

(2) This division, which forms a homogenous and monophyletic group of insects, is considered as representing a distinct suborder of Homoptera and is termed "Gularostria" by MacGillivray.

(3) Our knowledge of the fossil aphids is very incomplete, and they have been described from only Europe and North America, but most of the recent subfamilies are represented by them.

to the lateral tubercles on other body segments. In the first instar of *Greenidea*, two pairs of small conical lateral tubercles are present behind the cornicles, and the cornicles are short, conical, tubercle-like in shape, lacking hairs, and with an indistinct opening at the tip, as already mentioned in my previous papers. This feature apparently represents the original type of the cornicles, supporting the theory of Hottes. The lateral tubercles are seen in various groups of the family, being found well developed even in the rather primitive forms and it may be concluded that the ancestral form had lateral tubercles.

As is well known, the fossil aphids described from the Tertiary have, as a general rule, long wings, with the stigma elongate and narrow, and also very long legs, which are apparently primitive characters of the family.

Summarizing the accounts above given and also taking into consideration various other characters of the living and extinct forms, it must be assumed that in this family the following characters are primitive or ancestral:

"Body psyllid-like in general appearance. Head not fused with the pronotum, divided by a median suture on the dorsum, with no frontal tubercles. Antennae 6-jointed, with the distal part of the last segment very short; secondary sensoria circular. Eyes well developed, with ocular tubercles. Rostrum well developed. Mesonotum well divided into lobes in the winged form. Body with small lateral tubercles and short cornicles. Cauda and anal plate short, rounded. Wings long, with the stigma elongate and very long, held not horizontally in repose. Legs long, with the tarsi 2-jointed and 2 claws. Wax-pores not well developed. All the viviparous females and sexual forms alate, always with well developed rostrum".

The subfamily Agrioaphidinae (Calliperinae) includes several tribes of various degrees of specialization, but all the primitive characters mentioned above are found in this subfamily, although the cauda and anal plate are specialized in most genera. The biology of the subfamily is also very primitive; migration does not occur at all and in some genera all the viviparous females are alate. In my opinion the subfamily Agrioaphidinae perhaps represents the direct descendents of the ancestral form.

There is no general agreement among aphidologists as to the systematic position of the genus *Mindarus* Koch. In my opinion this genus is related to *Neophyllaphis* Takah. of the subfamily Agrioaphidinae and it is to be included in this subfamily (see my paper on *Mindarus japonicus* Takah., 1931).

Turning next to the subfamily Lachninae we find many primitive characters retained, as has been discussed by Baker. This group departed perhaps from the very primitive type of the ancestor.

In my opinion the genera *Greenidea* Schout., *Paratrichosiphum* n. g., *Greenideoidea* van der Goot, *Eutrichosiphum* Essig et Kuw., *Cervaphis* van der Goot, *Setaphis* van der Goot, *Brasilaphis* Mordv., and *Anomalaphis* Baker form an ancient, but an isotated group, the subfamily Greenideinae, which retains certain of the primitive characters and is intermediate between the Lachninae and the Aphidinae.

Boerner includes all these genera in the tribe Thelaxini of the subfamily Thelaxinae, but in my opinion they differ so remarkably from that subfamily in the following characters: (1) Mesonotum well divided into lobes in the alate form. (2) Cornicles sometimes well developed, with many hairs. (3) Cauda always not wart-shaped, not constricted basally. (4) Anal plate not bilobed. (5) Body with eminent tuberles or projections (in *Greenidea* and its allies the tubercles present only in the first instar). (6) Wings not held horizontally in repose, etc.

The subfamily Greenideinae have the following characters: Head not divided, fused with the pronotum in the apterous form except in *Anomalaphis* (according to Baker's figure). Frontal tubercles not well developed. Ocular tubercles eminently protruding. Eyes of the apterous form in some genera of 3 facets. Cornicles short or well developed, often provided with setae. Antennae with the distal part of the last joint long; secondary sensoria cirular or transversely narrowed. The 2nd oblique on the front wings often distinctly curved on the distal part. Cauda and anal plate short, rounded usually (in *Greenidea* cauda with a short median process on the hind margin). Body with a pair of or many tubercles or projections. In the tribe Greenideini the adults and grown nymphs have no tubercles and projections, but the nymphs of the first instar are furnished with 2 pairs of tubercles behind the cornicles. All the known oviparous females alate.

The pterostigma is usually not much elongated, but *Greenidea roepkei* van der Goot retains a very long pterostigma reaching to the tip of the wing. In this connection it is very remarkable that the cauda of *Greenidea* is similar to that of *Essigella* Del Guercio (Lachninae) and such a cauda can not be found in other subfamilies except in the nymphs of *Phyllaphoides* Takah. (Agrioaphidinae) and some others.

That the subfamily Greenideinae is ancient is also demonstrated by the fact that a fossil from the Miocene belongs, as pointed out by Mordvilko, to a living genus, *Greenidea* or *Paratrichosiphum*.

The subfamily Aphidinae, especially the tribe Macrosiphini, is a specialized group as has been recognized by Baker and others. The similarity between the Macrosiphini and the Drepanosiphini (Agrioaphidinae) in the characters of the

frontal tubercles and the antennae is perhaps due to the parallel development, and has no phylogenetic significance. Various degrees of development of the frontal tubercles and the antennae are found in each of the Agrioaphidinae and Aphidinae.

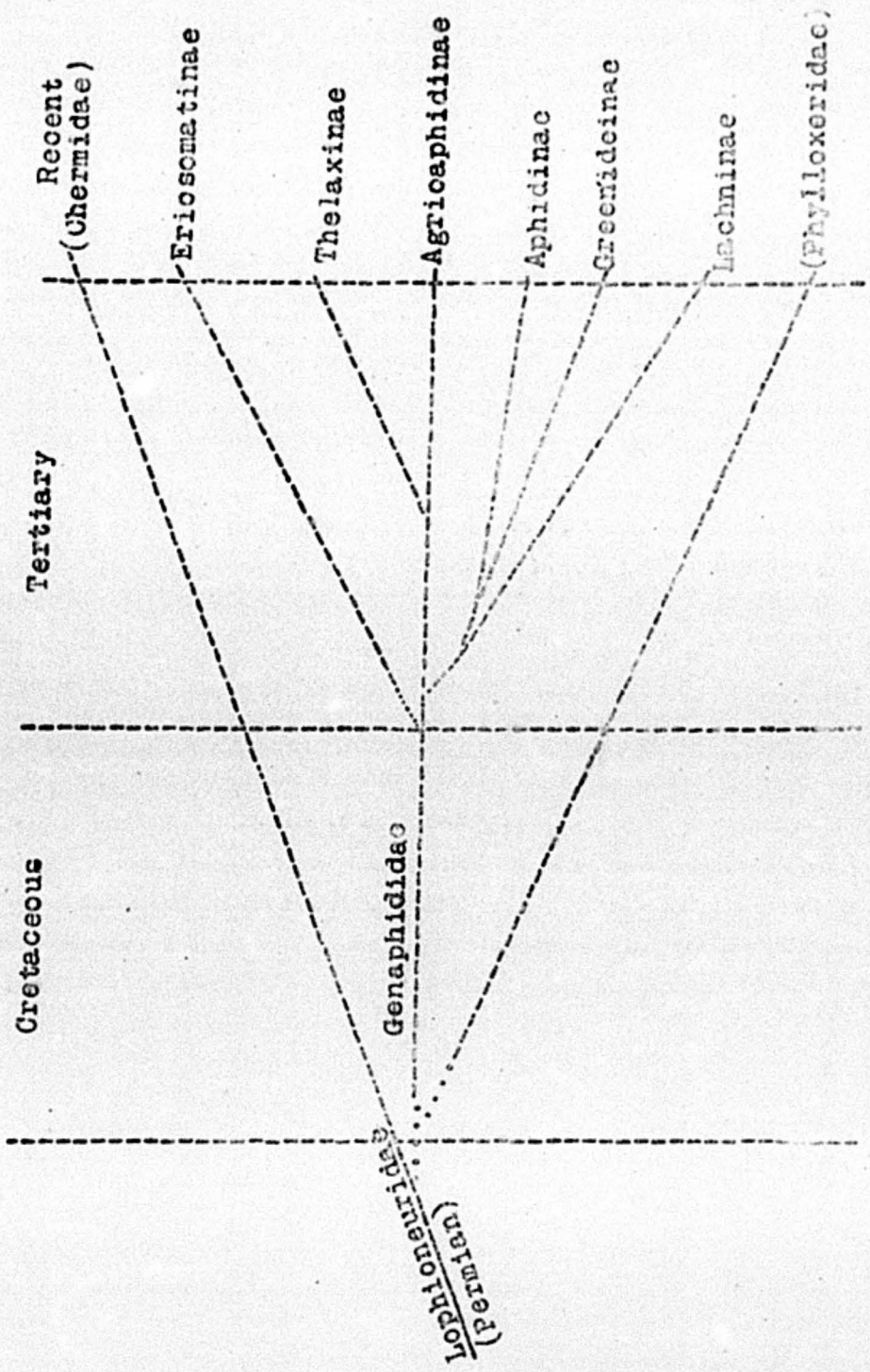
The Thelaxinae comes nearest to the Agrioaphidinae. In these subfamilies the cauda is often short, knobbed, and constricted at the base, the anal plate is often bilobed, and the tarsi are provided with capitate setae or stout empodial pairs. These structures are not seen in other subfamilies, and it is highly improbable that such specialized characters could have originated independently, in other words they are not due to convergence or homoplasmy, but due to descent from a common ancestor. However the Thelaxinae is a much more specialized group than the Agrioaphidinae, differing from the latter in many characters as follows: (1) In the apterous form the head and pronotum are always fused together. (2) Eyes of the apterous form are always rudimentary. (3) The antennae are from 3 to 5-jointed, usually the distal part of the last joint is very short. (4) The secondary sensoria are usually linear. (5) The mesonotum is always not divided into lobes. (6) The wings with the media simple or once branched are always held horizontally in repose. (7) The aleyrodiform females are developed in some genera. (8) Some species produce galls and migrate.

These subfamilies are so distinct as mentioned above that they can have no recent phylogenetic connection, and I treat them as distinct subfamilies, although they are regarded as a gronp by Mordvilko and Boerner.

In my opinion Boerner places various genera in his tribe Thelaxini where they should not be, and the subfamily Greenideinae is recognized and the genus *Mindarus* has been removed to the Agrioaphidinae.

The subfamily Eriosomatinae is a fairly highly evolved type of aphids and is a group distinctly departed from other subfamilies as has been recognized by many aphidologists.

The above ideas may by expresed in the phylogenetic diagram given herewith.


Recent
(Chermidae)
Eriosomatinae
Thelaxinae
Agricaphidinae
Aphidinae
Greenideinae
Lachninae
(Phylloxeridae)
Tertiary
Cretaceous
Genaphididae
Lophioneuridae
(Permian)

Classification of the Formosan Aphididae, with some biological notes.

Key to subfamilies.

(1) Sexual forms small, always with the rostrum rudimentary; oviparous female possessing only one ovarian tube in the adult stage, producing one egg; frontal tubercles always absent; distal part of the last antennal joint almost always very small, secondary sensoria on the antennae prominent, often transversely narrowed; eyes of the apterous form rudimentary; cornicles very short or absent; cauda short, not well developed; wax-plates well developed; tarsi sometimes 1-jointed; media (the 3rd oblique) not branched or once forked. .....Eriosomatinae.

— Sexual forms almost always with the rostrum functional, oviparous female with nearly all the ovarian tubes developed, usually producing several or more eggs. .....(2)

(2) Cauda often short, constricted at the base and wart-shaped, but sometimes broadly rounded; anal plate often bilobed or indented; cornicles usually short; tarsi often with capitate or eminent empodial hairs. .....(3)

— Cauda not constricted at the base nor wart-shaped; anal plate not bilobed nor indented; tarsi without capitate and eminent empodial hairs. .....(4)

(3) Mesonotum of the alate form not divided into distinct lobes; antennae 3-5-segmented, with the distal part of the last segment short, secondary sensoria often linear; frontal tubercles absent; head of the apterous form fused with the pronotum; eyes of the apterous form rudimentary; media not or once branched; cornicles always very short. .....Thelaxinae.

— Mesonotum of the alate form divided into lobes; antennae 5 or 6-segmented; media once or twice branched. .....Agrioaphidinae.

(4) Body hairy, without lateral tuberecles on the thorax and basal abdominal segments; head often divided by a median suture, not fused with the pronotum, without frontal tubercles; antennae with the distal part of the last joint very short, not longer than the basal part; cornicles very short, often on hairy cones; cauda short, almost always broadly rounded. .... Lachninae.

— Head not divided by a median suture; antennae with the distal part of the last joint long, often longer than the basal part; cornicles short or developed; cauda rounded, elongate or conical; body often with lateral or dorsal tubercles. .....(5)

(5) Head of the apterous form almost always fused with the pronotum; frontal tubercles not well developed; eyes of the apterous form sometimes of 3 facets; cornicles short or very well developed, often with hairs; cauda short, rounded, sometimes with a short median process; body with eminent tubercles or projections (in the tribe Greenideini the tubercles present only in the first instar) .....Greenideinae.

— Head never fused with the pronotum; frontal tubercles sometimes very well developed; eyes always of many facets; cornicles usually lacking hairs; cauda often conical or elongate. .....Aphidinae.

Subfamily Lachninae.

Key to tribes.

(1) Rostrum much longer than the body, retractable, rudimentary in the male... ..... Stomaphidini.

— Rostrum not so long, not retractable, not rudimentary in the male. .....(2)

(2) Media faintly indicated. .....Cinarini.

— Media not faintly indicated, though more slender than other veins. .....(3)

(3) Eyes well developed, with ocular tubercles.....Lachnini.

— Eyes without ocular tubercles or rudimentary in the apterous form. .... Anoecini.

Tribe Lachnini.

Key to genera.

(1) Stigma of the fore wings much elongated, extending to the tip of the wing. .....*Longistigma.*

— Stigma elongated, but not so long, not reaching the tip of the wing. .... *Tuberolachnus.*

Genus **Longistigma** Wilson.

Longistigma liquidambarus Takah.

Dilachnus liquidambarus Takah., Aphididae of Formosa, pt. 4, p. 42 (1925).

Longistigma liquidambarus Takah., Ibid., pt. 5, p. 11 (1927).

Host.—Liquidambar formosana.

Distr.—Taihoku, Nanto.

This species is closely allied to *L. caryae* Monell. The winged form with 4 large black patches on the side of abdomen and usually 9–16 sensoria on the 3rd antennal joint.

Genus **Tuberolachnus** Mordvilko.

This genus was considered a synonym of *Lachnus* Westw. (syn. *Pterochlorus* Baker) by Baker, but is different from it in the soft wings not imbricated nor reticulated, as well as, in the more narrow elongated stigma on the front wing.

Tuberolachnus saligna Gmelin.

Aphis saligna, Gmelin, Syst. Nat. p. 2209, no. 62 (1788) (not available).

Pterochlorus saligna, Theobald, Plant Lice Gr. Brit., III, p. 104 (1929).

Lachnus viminalis, Buckton, Mon. Brit. Aphid., III, p. 53 (1880); Del Guercio, Redia, V, p. 281 (1908); Theobald, Bull. Ent. Res., VI, p. 144 (1915); Maki, Forest Expt. St. Formosa, Spec. Rept., 1, p. 34 (1915),

Tuberolachnus viminalis, Mordvilko, Ann. Mus. Zool. Acad. Imp. Sc., XIII, p. 374 (1908); Essig, Pomona Coll. Jl. Ent. IV, p. 774 (1912); Das, Mem. Ind. Mus., VI, p. 257 (1918); Swain, Univ. Calif. Pub. Tech. Bull., III, p. 45 (1919); Takahashi, Aphididae of Formosa, pt. 1, p. 82 (1921); ibid. pt. 2, p. 156 (1923); Nevsky, Mon. Aphid. Middle Asia, p. 351 (1929); Knowlton, Can. Ent., LXII, p. 159 (1930).

Pterochlorus viminalis, Baker, U. S. Dept. Agr. Bull. 826, p. 18 (1920); Blanchard, Physis, VIII, p. 327 (1926).

Host.—Salix warburgi.

Distr.—Taihoku. China, Corea, Japan, India, Middle Asia, Africa, Europe, North America, South America.

Tribe Stomaphidini.

Genus **Stomaphis** Walker.

Stomaphis liquidambarus Takah.

Aphididae of Formosa, pt. 4, p. 43 (1925).

Host.—Liquidambar formosana.

Distr.—Nanto.

Tribe Cinarini.

Key to subtribes.

(1) Body much elongated, eyes without ocular tubercles, cornicles not on hairy cones. .....Eulachnina.

— Body not elongate, eyes with ocular tubercles (very small in *Unilachnus*), cornicles on hairy cones. .....Cinarina.

Subtribe Cinarina.

Key to genera.

(1) Media twice branched. .....*Cinara.*
— Media not twice branched. .....(2)
(2) Media once branched, ocular tubercles distinct, cornicles on large cones..... .....*Lachniella.*
— Media simple, ocular tubercles not distinct, cornicles on small cones. .... *Unilachnus.*

Genus **Cinara** Curtis.

Key to spedies.

(1) Antennae with stiff setae. .....(2)
— Antennae with many very long rather fine hairs. .....(3)
(2) Antennae with many setae which are nearly as long as or slightly longer than the 1st antennal joint. .....*C. pineti.*
— Antennae with a few setae shorter than the 1st antennal joint. .... *C. formosana.*
(3) The 3rd antennal joint of the winged form longer than the 4th and 5th taken together, with 15–18 sensoria, on Pinus.....*C. orientalis.*
— The 3rd antennal joint of the winged form nearly as long as the 4th and 5th taken together, with fewer sensoria. .....(4)
(4) The 3rd and 4th antennal joints of the wingless form lacking sensoria, legs mostly black, on Tsuga. .....*C. taiwana.*
— The 4th antennal joint of the wingless form with a sensorium, legs mostly pale, on Pinus or Thuja. .....(5)
(5) Wingless female with large dusky patches in 2 longitudinal rows on the dorsum of abdomen (these patches distinct in specimens treated with potash), tibiae black on the base, on Pinus. .....*C. pinidensiflorae.*
— Wingless female with no such large patches in specimens treated with potash, tibiae not black on the base, on Thuja. .....*C. thujafoliae.*

Cinara pineti Koch.

Lachnus pineti, Koch, Die Pflanz., p. 230 (1857); Cholodkovsky, Horae Soc. Ent. Ross., XXXI, p. 635 (1898); van der Goot, Beitr. Kenntn. Holland. Blattl., p. 405 (1915); Opmanis, Beitr. Kennt. Aphidf. Lettl., p. 102 (1928).

Dilachnus pineti, Blanchard, Physis, VIII, p. 331 (1926).

Lachnus pini, Maki, Forest. Expt. St. Formosa, Spec. Rept, 1, p. 35 (1915).

Dilachnus sp., Takahashi, Aphididae of Formosa, pt. 1, p. 82 (1921).

Dilachnus piniformosanus, Takahashi, Aphididae of Formosa, pt. 2, p. 47 (1923).

Neochmosis piniformosanus, Takahashi, Trans. Nat. Hist. Soc. Formosa, XX, p. 325 (1930).

Hosts.—Pinus thunbergii, P. luchuensis, P. massoniana.

Distr.—Taihoku, Hori, Koshun, Karenko. Loochoo, Japan, Corea, Europe, South America.

Cinara formosana Takah.

Dilachnus sp., Takahashi, Aphididae of Formosa, pt. 2. p, 46 (1923).

Dilachnus formosanus, Takahashi, Aphididae of Formosa, pt. 3, p. 73 (1924); ibid., pt. 4, p. 40 (1925).

Panimerus piniformosanus, Takahashi, Proc. Nat. Hist. Soc. Fukien Christ. Univ., I, p. 28 (1928).

Neochmosis formosanus, Takahashi, Trans. Nat. Hist. Soc. Formosa, XX, p. 325 (1930).

Hosts.—Pinus massoniana, P. luchuensis, P. thunbergii.

Distr.—Taihoku, Shinten, Hori, Tattaka. Loochoo, China.

Cinara taiwana Takah.

Dilachnus taiwanus, Takahashi, Aphididae of Formosa, pt. 4, p. 39 (1925).

Host.—Tsuga formosana.

Distr.—Sakuragamine.

Cinara orientalis Takah.

Dilachnus orientalis, Takahashi, Aphididae of Formosa, pt. 4, p. 37 (1925).

Host.—Pinus sp.

Distr.—Sakuragamine, Taihoku.

Cinara pinidensiflorae Essig et Kuw.

Lachnus pinidensiflorae, Essig and Kuwana, Proc. Calif. Acad. Sc., 4th ser., VIII, 3, p. 99 (1918).

Dilachnus pinidensiflorae, Takahashi, Aphididae of Formosa, pt. 1, p. 81 (1921); ibid., pt. 2, p. 135 (1923); Okamoto and Takahashi, Ins. Mats., I, p. 144 (1927).

Hosts.—Pinus massoniana, P. thunbergii.

Distr.—Taihoku. Corea, Japan.

Cinara thujafoliae Theob.

Lachniella thujafolia, Theobald, Bull. Ent. Res., IV, p. 335 (1914); Bull. Soc. Roy. Ent. Egypte, 1922, p. 66 (1923).

Lachnus thujafoliae, Takahashi, Aphididae of Formosa, pt. 1, p. 81 (1921), pt. 2, p. 135 (1923); pt. 3, p. 71 (1924).

Dilachnus thujafolia, Hall, Minist. Agr. Egypt, Tech. Sc. Serv., Bull. 68, p. 3 (1926).

Lachnus biotae, van der Goot, Contr. Fauna Ind. Neerl., I, 3, p. 161 (1917).

Dilachnus callitris, Froggatt, Forest Ins. Timber Borers, p. 56 (1927).

Host.—Thuja orientalis.

Distr.—Taihoku. Japan, Corea, Java, Africa, Australia.

Genus **Lachniella** Del Guercio.

Lachniella niitakayamensis Takah.

Lachnus niitakayamensis, Takahashi, Aphididae of Formosa, pt. 4, p. 36 (1925); pt. 5, p. 12 (1927).

Host.—Elaeagnus oldhami.

Distr.—Domon, Niitakayama.

Genus **Unilachnus** Wilson.

Unilachnus orientalis Takah.

Aphididae of Formosa, pt. 3, p. 74 (1924); Boll. Lab. Zool. Portici, XX, p. 147 (1927).

Host.—Pinus massoniana.

Distr.—Taihoku, Shinten, Giran. China, Loochoo.

Subtribe Eulachnina.

Genus **Eulachnus** Del Guercio.

Key to species.

(1) Apterous form dark green, hairs on the head longer than the 1st antennal joint.....*E. piniformosanus.*

— Apterous form yellowish brown, hairs on the head nearly as long as the 1st antennal joint.....*E. rileyi.*

Eulachnus rileyi Williams.

Lachnus rileyi, Williams, Aphididae of Nebraska, p. 24 (1911).

Eulachnus rileyi, Davis, Can. Ent., XLVI, p. 169 (1914); Wilson, Ent. News, XXX, p. 5 (1919); Takahashi, Aphididae of Formosa, pt. 2, p. 47 (1923).

Host.—Pinus massoniana.

Distr.—Taihoku. North America.

The Formosan species has not been positively identified, since the winged form has not been collected.

Eulachnus piniformosanus Takah.

Aphididae of Formosa, pt. 1, p. 83 (1921); pt. 2, p. 138 (1923); pt. 3, p. 75 (1924).

Hosts.—Pinus luchuensis, P. massoniana, P. thunbergii.

Distr.—Taihoku, Kagi, Koshun. Japan, Loochoo.

This species may be a synonym of *E. thunbergii* Wilson described from only the sexual forms collected in Japan.

Tribe Anoecini.

Key to subtribes.

(1) Eyes of the apterous form rudimentary. .....Anoecina.

— Eyes of the apterous form not rudimentary, but lacking ocular tubercles.... ..... Nippolachnina.

Subtribe Nippolachnina.

Genus **Nippolachnus** Mats.

Nippolachnus piri Mats.

Jl. Coll. Agr. Sapporo, VII, p. 382 (1917); Takahashi, Proc. Ent. Soc. Wash., XXI, p. 175 (1919); Trans. Sapporo Nat. Hist. Soc., VII, p. 198 (1919); Kurisaki, Dobuts. Zasshi, XXXII, p. 383 (1920); Takahashi, Aphididae of Formosa, pt. 2, p. 141 (1923); pt. 5, p. 13 (1927); Trans. Nat. Hist. Soc. Formosa, XIX, p. 100 (1929).

Anoecia piri, Essig and Kuwana, Proc. Calif. Acad. Sc., 4th ser., VIII, p. 168 (1918).

Hosts.—Pirus serotina, Raphiolepis indica, var. tashirei, R. sp.

Distr.—Taihoku, Hakumo, Suisha. Japan.

In Japan this species spends the winter on Eriobotrya japonica, but in Formosa it has not been found on this plant which is commonly cultivated.

Subtribe Anoecina.

Key to genera.

(1) Media once branched. .....*Anoecia.*

— Media twice branched.....*Aiceona.*

Genus **Anoecia** Koch.

Anoecia sp.

Aphididae of Formosa, pt. 4, p. 45 (1925).

Host.—Unknown.

Distr.—Hattsukan (Niitakayama).

Only a winged form with the antennae broken has been obtained, which is perhaps *Anoecia corni* Fab.

Genus **Aiceona** Takah.

Key to species.

(1) Wingless form yellowish green, the 3rd antennal joint of the winged female with over 50 sensoria. .....*A. osugii.*

— Wingless form almost black, with a purplish tinge, the 3rd antennal joint of the winged form with about 27–30 sensoria.....*A. actinodaphnis.*

Aiceona actinodaphnis Takah.

Aphididae of Formosa, pt. 1, p. 85 (1921), pt. 3, pl. X, B, fig. 2 (1924); Trans. Nat. Hist. Soc. Formosa, XX, p. 326 (1930).

Hosts.—Actinodaphne pedicellata, Lindera glauca.

Distr.—Shinten, Urai, Kanshirei. Loochoo.

Aiceona osugii Takah.

Aphididae of Formosa, pt. 3, p. 76 (1924).

Host.—Unknown.

Distr.—Funkiko (Arisan).

Subfamily Greenideinae.

Key to tribes.

(1) Body without projections and tubercles in the adult stage, but with 2 pairs of short tubercles behind the cornicles in the 1st instar; cornicles of the adult large, covered with many hairs. .....Greenideini.

— Body with eminent projections or tubercles, conicles short or long, sometimes with some setae. .....Cervaphidini.

Tribe Greenideini.

Key to genera.

(1) Antennae 5-jointed; caudal segment with no median process...*Eutrichosiphum*.

— Antennae 6-jointed; caudal segment with or without a median process.....(2)

(2) Caudal segment with a process.....*Greenidea*.

— Caudal segment without a process.....*Paratrichosiphum* n. g.

Genus **Greenidea** Schout.

Key to species.

(1) The 3rd antennal joint nearly as long as the distal part of the 6th, some of the hairs on the body fimbriated. .....(2)

— The 3rd antennal joint distinctly longer than the distal part of the 6th, hairs not fimbriated. .....(3)

— The 3rd antennal joint distinctly shorter than the distal part of the 6th, hairs fimbriated or not. .....(6)

(2) Apterous form green, with a long caudal process which is much longer than wide (winged form unknown) .....*G. schimae*.

— Apterous form dark yellowish brown, with a small caudal process which is as long as wide. .....*G. mangiferae*.

(3) Hind tibiae with transverse strias, caudal segment with a very small process which is sometimes almost indistinct, the 3rd antennal joint of the winged form with about 15 sensoria in a row. .....*G. viticola*.

— Hind tibiae not striate, caudal segment with a distinct process, the 3rd antennal joint of the winged form with sensoria in a row or scattered.....(4)

(4) The 3rd antennal joint of the winged form with sensoria in a row.....(5)
— The 3rd antennal joint of the winged form with sensoria not in a single row. .....*G. mushana.*
(5) Sensoria on the 3rd antennal joint circular, cornicles of the apterous form nearly as long as the 3rd antennal joint.....*G. kuwanai.*
— Sensoria on the 3rd antennal joint oval or transversely somewhat narrowed, cornicles of the apterous form longer than the 3rd antennal joint...*G. nigra.*
(6) Hairs on the body not fimbriated, the 3rd antennal joint of the alate form with many sensoria scattered over the whole length. .....*G. brideliae.*
— Some of hairs fimbriated, the 3rd antennal joint of the alate form with sensoria in a row or not. .....(7)
(7) Cornicles of the apterous form reticulated only at the base.....(8)
— Cornicles of the apterous form reticulated except on the distal part .....(9)
(8) Body green in the apterous form, the 3rd antennal joint of the alate form with about 20 sensoria in a single row.....*G. myricae.*
— Body dark yellowish brown in the apterous form, the 3rd antennal joint of the alate form with about 30 sensoria not in a row .....*G. formosana.*
(9) Body green (alate form unknown). .....*G. quercifoliae.*
— Body dark yellowish brown, the 3rd antennal joint of the alate form with about 20 sensoria in a single row. .....*G. ficicola.*

Greenidea brideliae Takah.

Trans. Nat. Hist. Soc. Formosa, XVIII, p. 46 (1928); XIX, p. 100 (1929).
Host.—Bridelia mononica.
Distr.—Kori, Kagi.

Greenidea myricae Takah.

Aphididae of Formosa, pt. 4, p. 31 (1925).
Host.—Myrica rubra.
Distr.—Tattaka.

Greenidea mangiferae Takah.

Aphididae of Formosa, pt. 4, p. 33 (1925); Trans. Nat. Hist. Soc., XIX, p. 100 (1929).

Hosts.—Mangifera indica, Euphoria longana.

Distr.—Kagi, Takesaki.

This species is closely related to *G. artocarpi* Westw. described by van der Goot, but differs from the figures of Westwood in the shorter cornicles. *G. anonae* Perg. is not found in Formosa.

Greenidea mushana Takah.

Aphididae of Formosa, pt. 4, p. 35 (1925).

Host.—Quercus sp.

Distr.—Tattaka.

Greenidea schimae Takah.

Trans. Nat. Hist. Soc. Formosa, XIX, p. 528 (1929).

Host.—Schima sp.

Distr.—Suisha.

Greenidea quercifoliae Takah.

Aphididae of Formosa, pt. 1, p. 64 (1921).

Host.—Quercus sp.

Distr.—Taihoku.

Greenidea ficicola Takah.

Aphididae of Formosa, pt. 1, p. 66 (1921); pt. 2, p. 116 (1923); pt. 4, p. 29 (1925); Mason, Suppl. Ent., no. 15, p. 87 (1927); Mordvilko, Works of App. Ent., Leningrad, XIV, 1, p. 45 (1929).

Hosts.—Ficus retusa, F. obscura, F. wightiana, F. sp.

Distr.—Over the lowlands of Formosa. Loochoo, Sumatra.

Greenidea formosana Maki.

Trichosiphum formosanum, Maki, Coll. Essays for Nawa, Gifu, p. 13 (1917); Formosan Agr. Rev., no. 138, p. 340 (1918).

Greenidea formosana, Takahashi, Aphididae of Formosa, pt. 1, p. 65 (1921); pt. 2, p. 115 (1923); pt. 3, p. 55 (1924); pt. 4, p. 29 (1925); Suenaga, Trans. Nat. Hist. Soc. Kagoshima, II, p. 108 (1930).

Hosts.—Psidium guyava, Rhodomyrtus tomentosa.

Distr.—All over the range of the hosts in Formosa. Loochoo, Japan.

Greenidea nigra Maki.

Trichosiphum nigrum, Maki, Coll. Essays for Nawa, p. 10 (1917); Formosan Agr. Rev., no. 138, p. 338 (1918).

Greenidea nigra, Takahashi, Aphididae of Formosa, pt. 1, p. 65 (1921).

Hosts.—Quercus formosana, Lithocarpus rhombocarpa, L. sp.

Distr.—Kappanzan, Suisha.

Greenidea kuwanai Perg.

Trichosiphum kuwanea, Pergande, Ent. News, XVII, p. 209 (1906); Okajima, Bull. Coll. Agr. Tokyo Imp. Univ., VIII, p. 2 (1908); Essig and Kuwana, Proc. Calif. Acad. Sc., 4th ser., VIII, p. 97 (1918); Takahashi, Dobuts. Zasshi, XXX, p. 368 (1918); Kurisaki, Dobuts. Zasshi, XXXII, p. 379 (1920).

Greenidea kuwanai, Takahashi, Proc. Ent. Soc. Wash., XXI, p. 174 (1919); Aphididae of Formosa, pt. 2, p. 117 (1923); pt. 4, p. 30 (1925); Okamoto and Takahashi, Ins. Mats., I, p. 140 (1927).

Hosts.—Quercus stenophylloides, Q. sp.

Distr.—Tosei, Sakuragamine, Taihoku. Corea, Japan, Siberia.

Greenidea viticola Takah.

Trans. Nat. Hist. Soc. Formosa, XIX, p. 98 (1929).

(Wingless viviparous female) Brownish yellow, slightly dusky on the dorsum of abdomen in some individuals. Antennae black, brownish yellow on the base of the 3rd joint and on the 1st and 2nd. Cornicles black. Cauda brownish yellow. Legs brownish yellow, slightly dusky on the tibiae and tarsi. Body with many very long bristles which are not stiff, curved and not branched nor dilated at the tip. Thorax and abdomen with numerous spinules on the venter. Antennae with many very long bristles which are as long as or longer than those on the head; the 3rd joint stout, somewhat curved, scarcely striated, without sensoria; the relative length of joints about as follows: III—57, IV—24, V—25, VI—18 + ?. Abdomen widest at the middle, nearly circular. Cornicles very long, stout, not swollen, gradually tapering on the distal half, somewhat curved on the distal part, stouter than the femur, about 10 times as long as wide, longer than the 3rd and 4th antennal joints taken together, reticulated on the basal two-thirds, with many transverse rows of minute spinules on the apical part and many very long bristles which are as long as or longer than those on the body. Caudal segment rounded, with an indistinct, very short, blunt process near the tip. Anal plate reticulated on the

middle area. Legs with many bristles; tibiae more slender than the 3rd antennal joint, hind tibiae a little longer than the 3rd antennal joint, with many transverse strias almost over the whole length; tarsi striate, shorter than the basal part of the last antennal joint.

Length of body—3.0 mm. Antenna—? Cornicle—1.5 mm.

A hair on abdomen—about 0.22 mm. Hind tibia—about 1.0 mm.

Host.—Vitis cantoniensis, V. sp.

Distr.—Suisha, Riyohen, Gyochi.

Some apterous and alate females were collected by the author on Oct. 2, 1929, at Gyochi. The apterous form is hitherto undescribed.

This species is not a typical species of the genus, the caudal segment possessing characters intermediate between *Greenidea* and *Paratrichosiphum*.

Genus **Paratrichosiphum** n.g.

Body with many very long bristles. Head not divided, fused with the pronotum in the apterous form. Frontal tubercles very short or scarcely developed. Eyes with eminent ocular tubercles. Antennae 6-jointed, distal part of the 6th joint long. Cornicles long, with many long bristles and spinules. Caudal segment rounded at the tip. Wing veins normal. Wax-plates absent.

Genotype.—*Greenidea tattakana* Takah.

Differs from *Greenidea* Schout. in that the caudal segment is rounded, wanting a process.

Key to species.

(1) Hind tibiae with distinct transverse strias.....(3)

— Hind tibiae not striate. .....(2)

(2) The 3rd antennal joint of the winged form with about 45 transversely narrowed sensoria, not in a row, over the whole length. .....*P. dubium.*

— The 3rd antennal joint with fewer circular sensoria in a single row. .....*P. tattakanum.*

(3) Nymph white (adult not known). .....*P.* sp.

— Nymph not white. .....(4)

(4) Wingless form without granules and spinules on the venter (winged form unknown).....*P. lithocarpi* n. sp.

— Body with many minute granules or spinules on the venter. .....(5)

(5) Wingless form much elongated; cornicles very long, as long as the body;

frontal tubercles short, but distinct.....*P. tenuicorpus.*

— Wingless form not much elongated; cornicles shorter than the body; frontal tubercles not distinct.....(6)

(6) Wingless form with a black marking on the dorsum; the 3rd antennal joint of the winged form with about 10–13 circular sensoria in a row on the basal two-thirds or three-fourths. .....*P. nigrofasciatum.*

— Wingless form with no black marking; the 3rd antennal joint of the winged form with about 20–25 oval sensoria sometimes not in a single row on the whole length. .....*P. taiwanum.*

Paratrichosiphum tenuicorpus Okaj.

Trichosiphum tenuicorpus, Okajima, Bull. Coll. Agr. Tokyo Imp. Univ., VIII, p. 4 (1908).

Greenidea tenuicorpus, Takahashi, Aphididae of Formosa, pt. 3, p. 55 (1924); pt. 4, p. 29 (1925).

Hosts.—Castanopsis formosana, C. subacuminata, C. sp., Lithocarpus spp., Quercus sp.

Distr.—Shussuiha near Daibu, Kusukusu, Botan, Suisha, Riyohen. Japan.

Paratrichosiphum dubium van der Goot.

Trichosiphum dubium, van der Goot, Rec. Ind. Mus., XIII, p. 178 (1917).

Greenidea dubius, Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 527 (1929).

Hosts.—Lithocarpus konishii, L. sp., Quercus glauca.

Distr.—Suisha, Taihoku. India.

Paratrichosiphum lithocarpi n. sp.

(Wingless viviparous female) Yellowish green. Antennae and legs pale yellowish brown. Cornicles yellowish green, not dusky on the apical part. Body elongate, narrow, broadest about the middle of abdomen, about 2.5 times as long as wide, soft, with many long, rather fine, bristles not branched nor capitate. Frontal tubercles very short, slightly diverging. Antennae with many very long rather fine hairs; the 3rd joint somewhat curved, lacking sensoria; the 6th imbricated; the relative length of joints about as follows: III—43, IV—14, V—15, VI—10+20. Rostrum reaching somewhat beyond the hind coxae. Abdomen longer than wide. Cornicles long, slightly curved, gradually somewhat tapering, on the

basal part as stout as the femur, about 11 times as long as wide, with many long rather fine bristles, and many minute spinules on the distal portion. Caudal segment without a process, with a few long bristles. Anal plate with no reticulated area recognizable. Legs with many bristles; hind tibiae longer than the 3rd antennal joint, almost straight or slightly curved, stouter than the 3rd antennal joint, with about 15 short transverse strias in a single row mostly on the basal half or basal three-fourths; hind tarsi shorter than the basal part of the 6th antennal joint.

Length of body.—about 2.5 mm. Antenna—about 2.0 mm.

Cornicle—about 1.5 mm. Hind tibia—about 0.95 mm.

Host.—Lithocarpus sp., attacking the lower side of young leaf.

Distr.—Shinsuiei (altitude about 1300 m.).

Some specimens were collected by the author on Nov. 18, 1930. Related to *P. tenuicorpus* Okaj., but differs in the colour, the shorter 3rd antennal joint, the shorter frontal tubercles, the less chitinized body lacking ventral granules and spinules, etc.

Paratrichosiphum taiwanum Takah.

Greenidea taiwana, Takahashi, Aphididae of Formosa, pt. 1, p. 67 (1921); pt. 4, p. 29, p. 57, Pl. III, A, fig. 2 (1925).

Hosts.—Meliosma rigida, M. rhoifolia.

Distr.—Shinten, Sozan, Shussuiha.

Paratrichosiphum tattakanum Takah.

Greenidea tattakana, Takahashi, Aphididae of Formosa, pt. 4, p. 30 (1925).

Hosts.—Castanopsis formosana, Quercus sp., Q. stenophylloides, Castanea formosana.

Distr.—Tattaka, Sakuragamine, Shikikun.

Paratrichosiphum nigrofasciatum Maki.

Trichosiphum nigrofasciatum, Maki, Coll. Essays for Nawa, Gifu, p. 16 (1917); Formosan Agr. Rev., no. 138, p. 342 (1918).

Greenidea nigrofasciata, Takahashi, Aphididae of Formosa, pt. 1, 65 (1921); pt. 4, p. 29 (1925).

Hosts.—Lithocarpus sp., Quercus glauca, Q. sp.

Distr.—Taihoku, Riyohen, Daidakusui, Hori, Shinten, Kowaron, Toyen, Domon. Loochoo.

Paratrichosiphum sp.

Greenidea sp., Takahashi, Aphididae of Formosa, pt. 4, p. 36 (1925).

Host.—Quercus sp.

Distr.—Tattaka.

Genus **Eutrichosiphum** Essig et Kuw.

The species of this genus are small in size, with the cornicles always much shorter than the body, and do not possess transverse strias or sensoria on the hind tibiae of the viviparous females.

Key to species.

(1) Distal part of the last antennal joint about twice or more times as long as the basal part, the 3rd antennal joint of the winged form with 2 sensoria..... ..... *E. minutum.*

— Distal part of the last antennal joint shorter, the 3rd antenal joint of the winged form with about 18-20 sensoria. .....*E. lithocarpi.*

Eutrichosiphum minutum Takah.

Aphididae of Formosa, pt. 2, p. 45 (1923).

Host.—Trachelospermum jasminoides.

Distr.—Taihoku, Kagi, Kowaron, Kanshirei.

Eutrichosiphum lithocarpi Maki.

Eutrichosiphum lithocarpi, Maki, Formosan Agr. Rev., no. 138, p. 344 (1918); Ent. Mag. Kyoto, IV, p. 21 (1919).

Eutrichosiphum lithocarpi, Takahashi, Aphididae of Formosa, pt. 1, p. 68 (1921); pt. 2, p. 118 (1923).

Eutrichosiphum pasaniae, Takahashi, Aphididae of Formosa, pt. 2, p. 67 (1923).

Hosts.—Castanopsis subacuminata, Lithocarpus uraiana, L. sp., Elaeocarpus japonicus.

Distr.—Urai, Funkiko, Suisha, Kowaron, Botan, Kusukusu, Riyohen. Loochoo.

Tribe Cervaphidini.

Key to subtribes.

(1) Eyes of 3 facets and head fused with the pronotum in the apterous form .....(2)

— Eyes developed, and head not fused with the pronotum. .....Anomalaphidina n. subt.

(2) Cornicles very long, apterous form with many long branched projections.....Cervaphidina.

— Cornicles short, apterous form with a pair of simple projections. ..... Setaphidina.

The subtribe Anomalaphidina [1] is not represented in Formosa.

Subtribe Cervaphidina.

Genus **Cervaphis** van der Goot.

Cervaphis quercus Takah.

Dobuts. Zasshi, XXX, p. 458 (1918); Aphididae of Formosa, pt. 1, p. 69 (1921); pt. 2, p. 118 (1923); pt. 3, p. 108 (1924); Okamoto and Takahashi, Ins. Mats., I, p. 140 (1927).

Diverosiphum kunugii, Shinji, Dobuts. Zasshi, XXXIV, p. 791 (1922).

Host.—Quercus variabilis.

Distr.—Taihoku, Hori, Taichu. Japan, Corea.

Subtribe Setaphidina.

Genus **Setaphis** van der Goot.

Setaphis formosanus Takah.

Trans. Nat. Hist. Soc. Formosa, XIX, p. 96 (1929).

Hosts.—Glochidion sphaerostigmum, G. sp.

Distr.—Suisha, Shinten.

The hind wings are much reduced in size, not reaching the 1st oblique of the front wing, narrow, and lacking obliques, but with 4 hooklets near the tip.

(1) This subtribe includes only *Anomalaphis* Baker.

Subfamily Aphidinae.

Key to tribes.

(1) Frontal tubercles prominent, sometimes imbricated or with spinules. .... Macrosiphini.

— Frontal tubercles not prominent, not imbricated, without spinules, although sometimes shrinked.....Aphidini.

Tribe Aphidini.

Key to genera.

(1) Cauda very short, broadly rounded; cornicles very short, shorter than wide. .....*Cryptosiphum.*

— Cauda developed; cornicles as long as or longer than wide.....(2)

(2) Apterous form distinctly shrinked on the dorsum.....(10)

— Apterous form not shrinked on the dorsum.....(3)

(3) Cornicles swollen on the middle or distal part. .....(4)

— Cornicles not swollen.....(7)

(4) Cornicles short, as long as or shorter than the cauda. .....(5)

— Cornicles long, longer than the cauda. .....*Rhopalosiphum.*

(5) Cauda abruptly conical, as long as the cornicle. .....*Brevicoryne.*

— Cauda not abruptly conical, much longer than the cornicle. .....(6)

(6) Cornicles minute, imbricated; cauda conical. .....*Brachycolus.*

— Cornicles much longer than wide, not imbricated; cauda, paticularly in the apterous form, large, long. .....*Hyalopterus.*

(7) Cornicles very small, expanded basally, nearly as long as wide; cauda much elongated, constricted about the middle. .....*Brachysiphoniella.*

— Cornicles longer than wide; cauda conical or elongate.....(8)

(8) Cauda abruptly conical.....*Anuraphis.*

— Cauda longer, constricted about the middle. .....(9)

(9) Media twice branched. .....*Aphis.*

— Media once branched. .....*Toxoptera.*

(10) Abdomen with a dorsal projection or tubercle on the 8th segment....*Cavariella.*

— Abdomen with no dorsal projection or tubercle. .....(11)

(11) Cornicles scarcely or slightly swollen; media twice branched; head normal. ..... *Micraphis* n. g.

— Cornicles swollen; media once branched; head of the apterous form with imbrications on the lower side.....*Vesiculaphis.*

Genus **Cryptosiphum** Buckton.

Cryptosiphum gallarum Kalt.

Aphis gallarum, Kaltenbach, Verb. Nat. V. Preuss. Rhein West, p. 206 (1856) (not available).

Cryptosiphum gallarum, Theobald, Plant Lice Gr. Brit., II, p. 325 (1927); Monzen, Saito Ho-on Kai Monogr., 1, p. 48 (1929).

Cryptosiphum artemisiae, Buckton, Mon. Br. Aphid., II, p. 145 (1877); Takahashi, Aphididae of Formosa, pt. 2, p. 43 (1923); pt. 3, p. 53 (1924); Okamoto and Takahashi, Ins. Mats., 1, p. 140 (1927).

Pseudolachnus yomogi, Shinji, Dobuts. Zasshi, XXXIV, p. 730 (1922).

Hosts.—Artemisia vulgaris, var. indica, A. capillaris.

Distr.—Taihoku, Shinchiku, Tansui. China, Corea, Japan, Europe.

Genus **Brachycolus** Buckton.

Brachycolus heraclei Takah.

Aphididae of Formosa, pt. 1, p. 60 (1921); pt. 2, p. 112 (1923); pt. 3, p. 50 (1924); Okamoto and Takahashi, Ins. Mats., 1, p. 139 (1927).

Hosts.—Heracleum sp., Apium graveolens, Cryptotaenia canadensis, Daucus carota, Oenanthe stolonifera, Coriandrum sativum.

Distr.—Taihoku, Heto. Botel Tobago, Loochoo, Japan, Corea, China.

Genus **Brevicoryne** van der Goot.

Brevicoryne brassicae L.

Aphis brassicae, Linne, Syst. Nat., II, 732, 12 (1758) (not available); Koch, Die Pflanz., p. 149 (1857); Buckton, Mon. Br. Aphid., II, p. 33 (1877); Sanborn, Kansas Univ. Sc. Bull., III, p. 54 (1904); Fullaway, Ann. Rept. Hawaii. Agr. Expt. St. 1909, p. 40 (1910); Essig, Pomona Coll. Jl. Ent., III, p. 523 (1911); Herrick, Jl. Econ. Ent., IV, p. 219 (1911); Herrick and Hungate, Cornell Univ. Agr. Expt. St., Bull. 300, p. 717 (1911); Theobald, Bull. Ent. Res., IV, p. 320 (1914); Maki, Agr. Expt. St. Formosa, Bull. 108, p. 25 (1916); Swain, Univ. Calif. Pub. Tech. Bull. Ent., III, p. 95 (1919).

Brevicoryne brassicae, van der Goot, Beitr. Kennt. Holland. Blattl., p. 246 (1915); Das, Mem. Ind. Mus., VI, p. 187 (1918); Takahashi, Aphididae of Formosa, pt. 1, p. 38 (1921); pt. 4, p. 27 (1925); Moreira, Inst. Biol. Defesa Agr., Bol. 2, p. 19 (1925); Blanchard, Physis, VIII, p. 12 (1925); Hall, Minist. Agr.

Egypt, Tech. Sc. Serv., Bull. 68, p. 27 (1926); Theobald, Plant Lice Gr. Brit., II, p. 45 (1927); Opmanis, Beitr. Kennt. Aphid. Lettl., p. 455 (1928); Monzen, Saito Ho-on Kai Mon., I, p. 46 (1929); Hori, Hokkaido Agr. Expt. St. Rept. 23, p. 121 (1929); Nevsky, Mon. Aphid. Middle Asia, p. 224 (1929).

Host.—Brassica oleracea.

Distr.—Sankakuho. Japan, India, Hawaii, Australia, Europe, Africa, North America, South America.

Genus **Hyalopterus** Koch.

Key to species.

(1) The 3rd antennal joint shorter than the 4th and 5th taken together, in the alate form with sensoria scattered. .....*H. arundinis.*

— The 3rd antennal joint longer than the 4th and 5th taken together, in the alate form with about 10-12 sensoria nearly in a row. .....*H. atriplicis.*

Hyalopterus atriplicis L.

Aphis atriplicis, Linne, Fn. Suec., 1000 (1746), Fn. Suec. ed. altera, 262 (1761) (not available); Hayhurst, Ann. Ent. Soc. Amer., II, p. 88 (1909).

Brevicoryne atriplicis, Nevsky, Mon. Aphid. Middle Asia, p. 222 (1929).

Hyalopterus atriplicis, Theobald, Plant Lice Gr. Brit., II, p. 26 (1927).

Aphis chenopodii, Kaltenbach, Mon., p. 107 (1843).

Brevicoryne chenopodii, Das, Mem. Ind. Mus., VI, p. 183 (1918).

Hyalopterus chenopodii, Takahashi, Aphididae of Formosa, pt, 3, p. 48 (1924).

Host.—Chenopodium album.

Distr.—Taihoku. India, Middle Asia, North America, Europe.

Hyalopterus arundinis Fab.

Aphis arundinis, Fabricius, Ent. Syst., IV, p. 212 (1794); Kaltenbach, Mon. p. 54 (1843).

Hyalopterus arundinis, Koch, Die Pflanz., p. 21 (1857): Buckton. Mon. Br. Aphid., II, p. 111 (1877); Patch, Maine Agr. Expt. St. Bull. 233, p. 265 (1914); Davidson, U. S. Dapt. Agr. Bull. 774 (1919); Swain Univ. Calif. Pub. Tech. Bull., Ent., III, p. 130 (1919); Okamoto and Takahashi, Ins. Mats., I, p. 140 (1927); Theobald, Plant Lice Gr. Brit., II, p. 19 (1927); Hori, Hokkaido Agr. Expt. St. Rept., 23, p. 140 (1929); Nevsky, Mon. Aphid. Middle Asia, p. 214 (1929).

Aphis pruni, Fabricius, Ent. Syst., IV, p. 213 (1794); Kaltenbach, Mon. p. 52 (1843).

Hyalopterus pruni, Koch, Die Pflanz., p. 22 (1857); Buckton, Mon. Br. Aphid., II, p. 110 (1877); Theobald, Bull. Ent. Res., IV, p. 331 (1914); van der Goot, Beitr. Kennt. Holland. Blattl., p. 261 (1915); Contr. Fauna Indes Neerl., 1, 3, p. 125 (1917); Das, Mem. Ind. Mus., VI, p. 225 (1918); Theobald, Bull. Ent. Res., VIII, p. 293 (1918); Takahashi, Trans. Sapporo Nat. Hist. Soc., Vii, p. 196 (1919); Kurisaki, Dobuts. Zasshi, XXXII, p. 378 (1920); Takahashi, Aphididae of Formosa, pt. 1, p. 40 (1921); pt. 2, p. 113 (1923); Hall, Minist. Agr. Egypt, Tech. Sc. Serv., Bull., 68, p. 30 (1926); Opmanis, Beitr. Kennt. Aphid. Lettl., p. 460 (1928).

Hosts.—Prunus communis, P. persica, Phragmites communis.

Distr.—Taihoku, Urai, Tansui, Shinchiku, Shushu, Kagi. China, Corea, Japan, India, Java, Middle Asia, Australia, New Zealand, Africa, Europe, North America.

The Formosan and Japanese specimens differ from the European ones in the fewer sensoria on the 3rd antennal joint and in lacking them usually on the 4th in the alate viviparous female.

Genus **Brachysiphoniella** Takah.

Brachysiphoniella graminis Takah.

Brachycolus gramini, Takahashi, Can. Ent., LII, p. 77 (1920); Dobuts. Zasshi, XXXII, p. 197 (1920).

Brachysiphoniella graminis, Takahashi, Aphididae of Formosa pt. 1. p. 62 (1921); pt. 2, p. 43, p. 113 (1923); pt. 3, p. 52 (1924); Theobald, Entom., LXII, p. 11. (1929).

Host.—Leersia hexandra.

Distr.—Taihoku, Suisha, Kagi. Shinka, Tainan. Japan, India.

Genus **Anuraphis** Del Guercio.

Key to species.

(1) Cornicles short, as long as or shorter than the cauda. .....(2)

— Cornicles much longer than the cauda; apterous form densely covered with powder; alate form with 2–5 sensoria on the 3rd antennal joint, but not on the 4th; wings infuscated along the veins.....*A. lanigera*.

(2) Dark green; cornicles imbricated; the 3rd antennal joint with 6–8 sensoria nearly in a row in the alate form, sometimes with a few sensoria in the apterous form; distal part of the last antennal joint as long as the base. ... .*A. formosanus.*

— Cornicles not imbricated; the 3rd antennal joint with many sensoria scattered in the alate form, without them in the apterous; distal part of the last antennal joint much longer than the base. .....*A. helichrysi.*

Anuraphis helichrysi Kalt

Aphis helichrysi, Kaltenbach, Mon., p. 102 (1843).

Brachycaudus helichrysi, van der Goot, Beitr. Kennt. Holland. Blattl., p. 256 (1915); Contr. Fauna Indes Neerl., 1, 3, p. 120 (1917): Opmanis, Beitr. Kennt. Aphid. Lettl., p. 458 (1928).

Anuraphis helichrysi, Takahashi, Aphididae of Formosa, pt. 1, p. 59 (1921); Blanchard, Physis, VI, p. 50 (1922); Takahashi, Nphididae of Formosa, pt. 2, p. 112 (1923); pt. 3, p. 46 (1924); Hall, Minist. Agr. Egypt, Tech. Sc. Serv., Bull. 68, p. 11 (1926); Theobald, Plant lice Gr. Brit., II, p. 245 (1927); Nevsky, Mon. Aphid. Middle Asia, p. 275 (1929).

Aphis pruni, Koch, Die Pflanz., p. 68 (1857).

Brachycaudus pruni, Das, Mem. Ind. Mus., VI, p. 222 (1918).

Hosts.—Ageratum conyzoides, Eupatorium formosanum, Prunus persica, Bidens pilosa.

Distr.—Tainoku, Takeyama. Japan, Corea, China, India, java, Sumatra, Ceylon, Australia, Egypt, Europe, North America, South America.

Anuraphis formosanus Takah.

Aphididae of Formosa, pt. 5, p. 6 (1927).

Host.—Blumea balsamifera.

Distr.—Hakumo.

Anuraphis lanigera Takah.

Aphididae of Formosa, pt. 5, p. 7 (1927); Trans. Nat. Hist. Soc. Formosa, XIX, p. 94 (1929).

Host.—Stauntonia hebandra.

Distr.—Sujsha.

Genus **Aphis** L.

Key to species.

(1) Cornicles nearly as long as or shorter than the cauda.....(2)
— Cornicles distinctly longer than the cauda. .....(7)
(2) Antennae with many long fine hairs, apterous form distinctly reticulated on the dorsum, cornicles sometimes with a few setae, cauda very stout, much larger than the cornicle. .....*A. odinae.*
— Antennae without long fine hairs, apterous form faintly or not reticulated on the dorsum, cornicles without hairs. .....(3)
(3) The 4th antennal joint of the alate form without sensoria. .....(4)
— The 4th antennal joint of the alate form with sensoria. .....(6)
(4) Apterous form with distinct powder, the 3rd antennal joint of the alate form with about 4 or 5 sensoria nearly in a row.....(5)
— Apterous form slightly or scarcely with powder, the 3rd antennal joint of the alate form with about 6–10 sensoria often not in a row.....*A. sacchari.*
(5) Cornicles shorter than the 3rd antennal joint. .....*A. droserae.*
— Cornicles longer than the 3rd antennal joint in the 6-jointed antennae..... ..... *A. kurosawai.*
(6) Apterous form distinctly with powder, wings infuscated along the veins, frontal tubercles somewhat protruding forewards on the mesal side, legs not entirely black, body blackish brown. .....*A. bambusae.*
— Apterous form not distinctly with powder, wings not infuscated, legs almost entirely black, body dark green. .....*A. maidis.*
(7) Apterous form with rudimentary, but distinct, ocelli, and sometimes with a few sensoria on the 3rd antennal joint; alate form with about 10 or more sensoria on the 4th antennal joint. .....*A. petasiticola.*
— Apterous form without ocelli and sensoria on the 3rd antennal joint; alate form with 0–5 sensoria on the 4th antennal joint.....(8)
(8) Cornicles entirely black. .....(10)
— Cornicles not black.....(9)
(9) Apterous form densely covered with powder, wings infuscated along the veins, cornicles dark green, stout, shorter than the 3rd antennal joint..... ..... *A. smilacifoliae.*
— Apterous form not covered with powder, wings not infuscated, cornicles pale, very long, slender, longer than the 3rd antennal joint. .....*A. saliceti.*
(10) The 3rd antennal joint of the alate form with 4–12 sensoria usually in a single row. .....(12)

— The 3rd antennal joint of the alate form with over 15 sensoria scattered ... . (11)

(11) The 3rd antennal joint of the alate form stout, nearly entirely black even in specimens treated with potash; apterous form with very distinct strias on the side below the cornicle, on Citrus. .....*A. citricidus.*

— The 3rd antennal joint of the alate form pale in specimens treated with potash; apterous form without so distinct strias.....*A. rumicis.*

(12) Green, dark green or yellow.....(13)

— Dark brown or black; the 3rd antennal joint of the alate form with about 5 or 6 sensoria; on the Leguminosae.....*A. laburni.*

(13) Cornicles of the apterous form very long, nearly as long as or a little shorter than the 3rd and 4th antennal joints taken together.....*A. pomi.*

— Cornicles of the apterous form much shorter than the 3rd and 4th antennal joints taken together. .....(14)

(14) Body always yellow, with a large black patch at the base of the cornicle, hind tibiae of the apterous form black, the 3rd antennal joint with about 10–12 sensoria and the 4th with 0–5 in the alate form, cornicles of the apterous form much longer than the 3rd antennal joint. .....*A. nerii.*

— Body yellow, green or dark geen, with no black patch at the base of the cornicle in the apterous form, cornicles of the apterous form nearly as long as or a little longer than the 3rd antennal joint. .....(15)

(15) Greenish yellow or yellow, the 3rd antennal joint of the alate form with 7–11 sensoria sometimes not in a single row and the 4th with 0–5; cauda black.....*A. malvoides.*

— Green, yellow or dark green, the 3rd antennal joint of the alate form usually with 4–6 sensoria in a row and the 4th usually lacking them; cauda yellowish green or dark green.....*A. gossypii.*

Aphis droserae Takah.

Aphididae of Formosa, pt. 1, p. 51 (1921); pt. 2, p. 109 (1923).

Host.—Drosera lourerii.

Distr.—Sozan.

Aphis bambusae Full.

Ann. Rept. Hawaii. Agr. Expt. St., 1909, p. 35 (1910); Takahashi, Aphididae of Formosa, pt. 1, p. 52 (1921); pt. 2, p. 106 (1923).

Melanaphis bambusae, van der Goot, Contr. Fauna Indes Néerl., I, 3, p. 61 (1917).

Hosts.—Arundinaria sp., Bambusa spp., Phragmites karka.

Distr.—Taihoku, Suisha, Tarowan. Loochoo, Japan, China, Java, Singapore, Hawaii.

Aphis kurosawai Takah.

Aphididae of Formosa, pt. 1, p. 53 (1921); pt. 2, p. 109 (1923).

Host.—Artemisia vulgaris, var. indica.

Distr.—Taihoku, Shirin, Karenko, Kusukusu,

Aphis sacchari Zehnt.

Arch. Java Suiker-Industrie, IX, p. 674 (1901); Fullaway, Ann. Rept. Hawaii. Agr. Expt. St. 1909, p. 35 (1910); Das, Mem. Ind. Mus., VI, p. 206 (1918); Moreira, Inst. Biol. Defesa Agr., Bol. 2, p. 18 (1925).

Longiunguis sacchari, van der Goot, Contr. Fauna Indes Neerl., I, 3, p. 116 (1917).

Aphis miscanthi, Takahashi, Aphididae of Formosa, pt. 1, p. 55 (1921); pt. 2, p. 108 (1923); pt. 3, p. 45 (1924).

Aphis formosanus, Takahashi, Aphididae of Formosa, pt. 1, p. 54 (1921); pt. 2, p. 107 (1923).

Hosts.—Miscanthus sp., Saccharum officinarum, Sorghum vulgare, Zea mays.

Distr.—Taihoku, Koshun, Shinten, Urai, Kanshirei. Botel Tobago, Hokoto, Loochoo, Japan, Philippine, India, Java, Hawaii, Africa, South America.

Aphis saliceti Kalt.

Monog., p. 103 (1843); Koch, Die Pflanz., p. 118 (1857); Buckton, Monog. Brit. Aphid., II, p. 52 (1877); van der Goot, Beitr. Kennt. Holland. Blattl., p. 225 (1915); Gillette and Bragg, Can. Ent., L, p. 89 (1918); Haviland, Ann. App. Biol., VI, p. 311 (1920); Takahashi, Aphididae of Formosa, pt. 1, p. 47 (1921); pt. 2, p. 104 (1923); Treubia, VIII, p. 462 (1926); Theobald, Plant Lice Brit., II, p. 171 (1927); Opmanis, Beitr. Kennt. Aphid. Lettl., p. 447 (1928); Nevsky, Mon. Aphid. Middle Asia, p. 200 (1929).

Aphis yanagicola, Matsumura, Jl. Coll. Agr. Sapporo, VII, p. 390 (1917).

Hosts.—Salix warburgi, S. sp.

Distr.—Taihoku. Japan, Sumatra, Europe, North America.

Aphis pomi De Geer.

Mem. des Ins., III, p. 53 (1773) (not available); Gillette, Jl. Econ. Ent., I, p. 303 (1908); Shiraki, Agr. Expt. St. Formosa, Spec. Rept., no. 8, p. 120 (1913); Theobald, Bull. Ent. Res., IV, p. 323 (1914); Patch, Maine Agr. Expt. St. Bull. 233, p. 267 (1914); van der Goot, Beitr. Kennt. Holland. Blattl., p. 210 (1915); Theobald, Can. Ent., XLVIII, p. 173 (1916); Baker and Turner, Jl. Agr. Res., V, p. 955 (1916); Smulyan, Psyche, XXV, p. 21 (1918); Swain, Univ. Calif. Pub., Tech. Bull., Ent., III, p. 120 (1919); Matheson, Cornell Univ. Agr. Expt. St. Mem., 24, p. 686 (1919); Takahashi, Aphididae of Formosa, pt. 1, p. 48 (1921); pt. 2 p, 103 (1923); Patch, Maine Agr. Expt. St. Bull., 313, p. 45 (1923); Theobald, Plant Lice Brit., II, p. 133 (1927); Opmanis, Beitr. Kennt. Aphid. Lettl., p. 438 (1928); Hori, Hokkaido Agr. Expt. St. Rept., 23, p. 117 (1929); Nevsky, Mon. Aphid. Middle Asia, p. 193 (1929); Patch, Jl. Econ. Ent., XXII, p. 698 (1929); Theobald, Jl. South-eastern Agr. Coll., no. 26, p. 121 (1929).

Hosts.—Glochidion hongkongense, Pirus serotina, Jussiaea erecta.

Distr.—Taihoku, Suisha, Kagi. Cosmopolitan.

Aphis malvoides van der Goot.

Contr. Fauna Indes Neerl., I, 3, p. 96 (1917); Takahashi, Aphididae of Formosa, pt. 2, p. 37, p. 103 (1923); pt. 3, p. 43 (1924).

Hosts.—Bidens pilosa, Emilia sonchifolia.

Distr.—Taihoku. Java, Singapore, China.

Aphis gossypii Glov.

Rept. Comm. Agr. U.S.A., 1876, p. 36 (1877) (not available); Pergande, Ins. Life, VII, p. 309 (1894); Gillette, Jl. Econ. Ent. I, p. 177 (1908); Fullaway, Ann. Rept. Hawaii. Agr. Expt. St., 1909, p. 39 (1910); Essig, Pomona Jl. Ent., III, p. 590 (1911); Theobald, Bull. Ent. Res., IV, p. 321 (1914); Maki, Agr. Expt. St. Formosa, Bull. 108, p. 33 (1916); van der Goot, Contr. Fauna Indes Neerl., I, 3, p. 93 (1917); Das, Mem. Ind. Mus., VI, p. 219 (1918); Essig and Kuwana, Proc. Calif. Acad. Sc. 4th ser., VIII, p. 68 (1918); Swain, Univ. Calif. Pub., Tech. Bull., Ent., III, p. 105 (1919); Paddock, Texas Agr. Expt. St. Bull. 257 (1919); Takahashi, Aphididae of Formosa, pt. I, p. 45 (1921); Mason, Florida Ent., V, p. 58 (1922); Takahashi, Aphididae of Formosa, pt. 2, p. 97 (1923); Blanchard, Physis, VII, p. 31 (1923); Patch, Maine Agr. Expt. St., Bull., 313, p.

46 (1923); Theobald, Bull. Soc. Roy. Ent. Egypte, 1922, p. 50 (1923); Takahashi, Aphididae of Formosa, pt. 4, p. 28 (1925); Timberlake, Proc. Hawaii. Ent. Soc., V, p. 452 (1924); Moreira, Inst. Biol. Defesa Agr., Bol. 2, p. 14 (1925); Patch, Maine Agr. Expt. St. Bull., 326, p. 185 (1925); Takahashi, Deli Expt. St. Medan, Rept., no. 24, Reprint, p. 4 (1925); Hall, Minist. Agr. Egypt, Tech. Sc. Serv., Bull. 68, p. 18 (1926); Okamoto and Takahashi, Ins. Mats., I, p. 137 (1927); Theobald, Plant Lice Brit., II, p. 141 (1927); Batchelder, Ann. Ent. Soc. Amer., XX, p. 263 (1927); Hori, Hokkaido, Agr. Expt. St. Rept., 23, p. 109 (1929); Nevsky, Mon. Aphid. Middle Asia, p. 168 (1929); Monzen, Saito Ho-on Kai Monog., I, p. 52 (1929); Takahashi, Trans. Nat. Hist. Soc. Formosa, XX, p. 274 (1930).

Aphis malvae, Koch, Die Pflanz., p. 125 (1857); Das, Mem. Ind. Mus., VI, p. 213 (1918); Takahashi, Aphididae of Formosa, pt. 1, p. 46 (1921); pt. 2, p. 99 (1923).

Aphis tectonae, van der Goot, Contr. Fauna Indes Neerl., I, 3, p. 111 (1917).

A. shirakii, Takahashi, Aphididae of Formosa, pt. 1, p. 58 (1921); pt. 2, p. 109 (1923); Philippine Jl. Sc., XXI, p. 421 (1922).

A. clerodendri, Matsumura, Jl. Coll. Agr. Sapporo, VII, p. 385 (1917).

A. colocasiae, Matsumura, Jl. Coll. Agr. Sapporo, VII, p. 386 (1917).

A. gossypii Glov., var. *callicarpae*, Takahashi, Aphididae of Formosa, pt. 1, p. 46 (1921); pt. 2, p. 99 (1923).

Toxoptera leonuri, Takahashi, Aphididae of Formosa, pt. 1, p. 41 (1921); pt. 2, p. 94 (1923).

Hosts.—Abelmoschus moschatus, Acanthopanax trifoliatum, Bougainvillaea spectabilis, Blumea balsamifera, Callicarpa formosana, Clerodendron sp., Colocasia esculenta, C. kotoensis, Casuarina equisetifolia, Citrullus vulgaris, Cucumis sativus, Chrysanthemum sinense, Eucalyptus sp., Ficus sp., Glycine max, Gnaphalium sp., Gossypium sp., Hibiscus rosa-sinensis, H. sp., Ixora chinensis, Justicia procumbens, Lactuca debilis, Leonurus sibiricus, Liquidambar formosana, Melastoma candidum, Ouroupatia formosana, Portulaca oleracea, Psidium guyava, Pirus serotina, Perilla ocymoides, Punica granatum, Salix warburgi, Solanum melongena, Tectona grandis, Bidens pilosa, Eriobotrya sp., Breynia sp.

Distr.—Over the whole area of Formosa. Cosmopolitan.

This species may be the same with *Aphis frangulae* Koch (Die Pflanz., p. 142).

I have observed some winged viviparous female resting, but not producing young, on Allium scorodoprasum, var. viviparum.

Aphis rumicis L.

Linne, Syst. Nat. Ed. 10, I, p. 451 (1758) (not available); Buckton, Mon. Brit. Aphid., II, p. 85 (1877); Gillette, Jl. Econ. Ent., III, p. 406 (1910); Patch, Maine Agr. Expt. St., Bull., 202, p. 177 (1912); Theobald, Bull. Ent. Res., IV, p. 329 (1914); Can. Ent., XLVIII, p. 234 (1916); van der Goot, Beitr. zur. Kennt. Holland. Blattl., p. 220 (1915); Das, Mem. Ind. Mus., VI, p. 203 (1918); Swain, Univ. Calif. Pub. Tech. Bull. Ent., III, p. 101 (1919); Davidson, Bull. Ent. Res., XII, p. 81 (1921); Takahashi, Aphididae of Formosa, pt. 1, p. 47 (1921); pt. 2, p. 101 (1923); Moreira, Biol. Inst. Defesa Agr., Bol. 2, p. 17 (1925); Hall, Minist. Agr. Egypt, Tech. Sc. Serv., Bull. 68, p. 25 (1926); Janisch, Arb. Biol. Reichsanst. Land- u. Forstw., XIV, p. 330 (1926); Theobald, Plant Lice Brit., II, p. 98 (1927); Franssen, Aphis favae, p. 7, p. 41 (1927); Roepke, Stett. Ent. Zeitg., LXXXIX, p. 17 (1928); Opmanis, Beitr. Kennt. Aphid. Lettl., 442 (1928).

Hosts.—Solanum nigrum, Rumex crispus.

Distr.—Taihoku, Kiirun, Shinchiku. Cosmopolitan.

Aphis laburni Kalt.

Monog., p. 85 (1843); Koch, Die Pflanz., p. 86 (1857): Theobald, Plant Lice Brit., II, p. 122 (1927); Hori, Hokkaido Agr. Expt. St. Rept. 23, p. 112 (1929); Nevsky, Mon. Aphid. Middle Asia, p. 181 (1929).

Aphis medicaginis, Koch, Die Pflanz., p. 94 (1857); Gillette, Jl. Econ. Ent., I, p. 177 (1908); Essig, Pomona Jl. Ent., III, p. 527 (1911); Theobald, Bull. Ent. Res., VI, p. 128 (1915); van der Goot, Contr. Fauna Indes Neerl., I, 3, p. 98 (1917); Essig and Kuwana, Proc. Calif. Acad. Sc., 4th ser., VIII, p. 71 (1918); Das, Mem. Ind. Mus., VI, p. 203 (1918); Swain, Univ. Calif. Pub. Tech. Bull., Ent., III, p. 114 (1919); Takahashi, Aphididae of Formosa, pt. 1, p. 46 (1921); pt. 2, p. 101 (1923); Hall, Minist. Agr. Egypt, Tech. Sc. Serv., Bull. 68, p. 23 (1926).

Aphis rumicis, Maki (nec. L.). Agr. Expt. St. Formosa, Bull. 108, p. 36 (1916).

Hosts.—Aeschynomene indica, Astragalus sinicus, Arachis hypogaea, Glycine soja, Pisum sp., Vicia fava, Wikstroemia indica.

Distr.—Very common over the island. Cosmopolitan.

Aphis nerii Boyer.

Ann. Soc. Ent. Fr., X, p. 179 (1841) (not available); Essig, Pomona Jl. Ent., III, p. 530 (1911); Theobald, Bull. Ent. Res., IV, p. 329 (1914); van der Goot, Contr. Fauna Ind. Neerl., I, 3, p. 101 (1917); Das, Mem. Ind. Mus., VI, p. 204 (1918); Moreira, Bull. Soc. Ent. Fr., 1919, p. 236 (1919); Swain, Univ. Calif. Pub. Tech. Bull. Ent. III, p. 117 (1919); Takahashi, Aphididae of Formosa, pt. 2, p. 38, p. 104 (1923); Blanchard, Physis, VII, p. 39 (1923); Moreira, Inst. Biol. Defesa Agr. Bol. 2, p. 16 (1925); Hall, Minst. Agr. Egypt, Tech. Sc. Serv. Bull. 68, p. 23 (1926); Okamoto and Takahashi, Ins. Mats., I, p. 138 (1927); Takahashi, Kontyu, IV, p. 48 (1930).

Hosts.—Asclepias curassavica, Nerium indicum.

Distr.—Taihoku, Kusukusu. Loochoo, Corea, India, Java, Europe, North America, South America, Africa.

Aphis smilacifoliae Takah.

Aphididae of Formosa, pt. 1, p. 49 (1921); pt. 2, p. 96 (1923); Trans. Nat. Hist. Soc. Formosa, XVII, p. 390 (1927).

Host.—Smilax china.

Distr.—Taihoku, Sozan, Hokuto, Suisha, Kagi. China, Japan.

Aphis citricidus Kirk.

Myzus citricidus, Kirkaldy, Proc. Ent. Soc. Hawaii, I, p. 100 (1907); Fullaway, Ann. Rept. Hawaii. Agr. Expt. St., 1909, p. 27 (1910); Shiraki, Agr. Expt. St. Formosa, Spec. Rept., 8, p. 112 (1913).

Aphis citricidus, Mason, Suppl. Ent., XV, p. 87 (1927).

Aphis tavaresi, Del Guercio, Redia, XII, p. 217 (1917); Theobald, Bull. Ent. Res., IV, p. 323 (1914); van der Goot, Contr. Fauna Ind. Neerl., I, 3, p. 108 (1917); Takahashi, Aphididae of Formosa, pt. 1, p. 48 (1921); pt. 4, p. 57 (1925); Treubia, VIII, p. 462 (1926).

Host.—Citrus spp.

Distr.—Taihoku, Sozan, Nanto, Heto. Loochoo, Japan, China, India, Java, Sumatra, Ceylon, Africa, South America, Hawaii.

Aphis petasiticola Takah.

Aphididae of Formosa, pt. 3, p. 42 (1924).

Host.—Petasites tricholobus.

Distr.—Taihoku. Japan.

Aphis maidis Fitch.

Insects of N.Y., I, p. 318 (1855) (not available); Sanborn, Kansas Univ. Sc. Bull., III, p. 58 (1904); Davis, U.S. Dept. Agr. Tech. Ser., 12, p. 144 (1909); Fullaway, Ann. Rept. Hawaii. Agr. Expt. St., 1909, p. 41 (1910); Patch, Maine Agr. Expt. St. Bull. 202, p. 173 (1912); Shiraki, Agr. Expt. St. Formosa, Spec. Rept., 8, p. 126 (1913); Vuillet, Bull. Soc. Ent. Fr., 1914, p. 116 (1914); Theobald, Bull. Ent. Res., VI, p. 128 (1915); Das, Mem. Ind. Mus., VI, p. 208 (1918); Takahashi, Aphididae of Formosa, pt. 1, p. 57 (1921); pt. 2, p. 107 (1923); Blanchard, Physis, VII, p. 37 (1923); Moreira, Inst. Biol. Defesa Agr., Bol. 2, p. 15 (1925); Hall, Minist. Agr. Egypt, Tech. Sc. Serv., Bull. 68, p. 22 (1926); van Breemen, Meded. Proefst. Java-Suikerind. 1926, p. 513 (1926); Okamoto and Takahashi, Ins. Mats., I, p. 138 (1927).

Siphonaphis maidis, van der Goot, Contr. Fauna Ind. Neerl., I, 3, p. 67 (1917).

Hosts.—Setaria italica, Oryza sativa, Hordeum sativum, Sorghum sp., Zea mays, a plant of the Gramineae.

Distr.—Common over Formosa. Corea, Japan, China, India, Java. Sumatra, Palau Island, Hawaii, North America, South America, Africa, etc.

Aphis odinae van der Goot.

Longiunguis odinae, van der Goot, Contr. Fauna Indes Neerl., I, 3, p. 113 (1917).

Aphis odinae, Takahashi, Philippine Jl. Sc., XXIV, p. 712 (1924); Okamoto and Takahashi, Ins. Mats., I, p. 138 (1927).

Aphis somei, Essig and Kuwana, Proc. Calif. Acad. Sc. 4th ser., VIII, p. 75 (1918); Takahashi, Aphididae of Formosa, pt. 1, p. 58 (1921); pt. 2, p. 110 (1923).

Somaphis somei, Shinji, Lansania, I, 7, p. 110 (1929).

Aphis ficicola, Takahashi, Aphididae of Formosa, pt. 1, p. 57 (1921); pt. 2, p. 110 (1923).

Arimakia araliae, Matsumura, Jl. Coll. Agr. Sapporo, VII, p. 406 (1917).

Arimakia taranboni, Matsumura, Jl. Coll. Agr. Sapporo, VII, p. 407 (1917); Trans. Sapporo Nat. Hist. Soc., VII, p. 17 (1918).

Hosts.—Agalma lutchuense, Citrus sp., Ficus wightiana, Bischoffia javanica, Rhus semialata, Sapium sebiferum, Pittosporum tobira, Polygonum multiflorum, Viburnum formosanum, Wendlandia paniculata, Mangifera indica.

Distr.—Taihoku, Shirin, Kiirun, Kagi, Shinka, Suisha, Tansui, Shinten. Loochoo, China, Corea, Japan, India, Java.

The cauda is variable in shape and the cornicles are sometimes furnished with hairs.

Genus **Toxoptera** Koch.

Key to species.

(1) Body dark brown or black. .....(2)

— Body green or yellow; alate form with secondary sensoria on the 4th and 5th antennal joints.....*T. piricola.*

(2) Apterous form reticulated on the dorsum, with very distinct strias near the base of the cornicle and a few setae on the abdomen.....*T. aurantii.*

— Apterous form not reticulated on the dorsum, without strias, provided with many rather long hairs.....*T. scirpi.*

Toxoptera aurantii Boyer.

Aphis aurantii, Boyer, Ann. Soc. Ent. Fr., X, p. 178 (1841) (not available).

Toxoptera aurantii, Koch, Die Pflanz., p. 254 (1857); Fullaway, Ann. Rept. Hawaii. Agr. Expt. St., 1909, p. 31 (1910); Essig, Pomona Jl. Ent., III, p. 601 (1911); Phillips and Davis, U·S. Dept. Agr. Tech. ser., 25, p. 8 (1912); Theobald, Bull. Ent. Res., IV, p. 332 (1914); Del Guercio, Redia, XII, p. 230 (1917); van der Goot, Cont. Fauna Ind. Neerl., I, 3, p. 76 (1917); Swain, Univ. Calif. Pub. Tech. Bull. Ent., III, p. 129 (1919); Takahashi, Dobuts. Zasshi, XXXII, p. 197 (1920); Aphididae of Formosa, pt. 1, p. 42 (1921); pt. 2, p. 94 (1923); Timberlake, Proc. Hawaii. Ent. Soc., V, p. 454 (1924); Blanchard, Physis, VIII, p. 20 (1925); Moreira, Ins. Biol. Defesa Agr. Bol. 2, p. 22 (1925); Takahashi, Treubia, VIII, p. 462 (1926); Mason, Suppl. Ent., XV, p. 88 (1927); Theobald, Ent., LXII, p. 10 (1929).

Toxoptera citrifoliae, Shiraki, Agr. Expt. St. Formosa, Spec. Rept., 8, p. 123 (1913).

Hosts.—Viburnum odoratissimum, Pittosporum tobira, Ardisia sieboldii, Coffea arabica, Macaranga tanarius, Thea chinensis, T. caudata, Scolopia crenata, Salix warburgi, Styrax suberifolium, Caladium sp., Citrus spp., Morus alba, Murraya exotica, Ficus aukeotsang, F. retusa, F. foveolata, Gardenia florida, Anona sp., Ehretia buxifolia.

Distr.—Taihoku, Shirin, Sozan, Matsuyama, Suisha, Kagi, Kanshirei, Shussuiha. Widely distributed over tropical and subtropical countries in the world.

Toxoptera piricola Mats.

Jl. Coll. Agr. Sapporo, VII, p. 414 (1917); Essig and Kuwana, Proc. Calif. Acad. Sc., 4th ser., VIII, p. 80 (1918); Okamoto and Takahashi, Ins. Mats., I, p. 136 (1927); Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 251 (1929); Monzen, Saito Ho-on Kai Monog., I, p. 49 (1929); Hori, Hokkaido Agr. Expt. St. Rept. 23, p. 137 (1929).

Host.—Pirus serotina.

Distr.—Shirin. Japan, Corea.

Toxoptera scirpi Pass.

Bull. Soc. Ent. Italia, VI, p. 137 (1874); Phillips and Davis, U.S. Dept. Agr. Bur. Ent., Tech. ser., 25, pt. 1, p. 8 (1912); Del Guercio, Redia, XII, p. 230 (1917); Mordvilko, Pucerons Gram., I, p. 48 (1921); Bull. Ent. Res., XIII, p. 29 (1922); Takahashi, Aphididae of Formosa, pt. 4, p. 28 (1925).

Host.—Scirpus lacustris.

Distr.—Tarowan. Europe.

Genus **Rhopalosiphum** Koch.

Key to species.

(1) Apterous form with short, but distinct, fan-like or capitate setae; cornicles of the alate form longer than the distal part of the last antennal joint..... ..... *R. lahorensis.*

— Apterous form with no such setae; cornicles of the alate form shorter than or nearly as long as the distal part of the last antennal joint. .....(2)

(2) Distal part of the last antennal joint shorter than the 3rd, apterous form reticulated on the dorsum, wings somewhat infuscated along the veins..... .....*R. pseudobrassicae.*

— Distal part of the last antennal joint longer than the 3rd, apterous form not reticulated on the dorsum, wings not infuscated.....(3)

(3) Cornicles distinctly imbricated.....*R. prunifoliae.*

— Cornicles not imbricated on the distal swollen part.....*R. nymphaeae.*

Rhopalosiphum prunifoliae Fitch.

Aphis prunifoliae, Fitch, Fist Rept. Nox. and Ben. Ins. N.Y., p. 122 (1855) (not available).

Rhopalosiphum prunifoliae, Baker and Turner, Jl. Agr. Res., XVIII, p. 311 (1919); Hori, Hokkaido Agr. Expt. St. Rept. 23, p. 124 (1929).

Rhopalosiphum avenae, Takahashi (nec. Fab.), Aphididae of Formosa, pt. 2, p. 34, p. 92 (1923) (in part); Hori, Hokkaido Agr. Expt. St. Rept. 17, p. 1 (1926).

Yamataphis papaveris, Takahashi, Aphididae of Formosa, pt. 1, p. 39 (1921).

Hosts.—Prunus mume, P. sp., Triticum vulgare, Papaver somniferum.

Distr.—Taihoku, Hokuto, Shinchiku, Toyohara. Japan, China, Europe, North America.

Rhopalosiphum nymphaeae L.

Aphis nymphaeae, Linne, Syst. Nat., II, p. 714 (1767) (not available); Kaltenbach, Mon., p. 104 (1843).

Rhopalosiphum nymphaeae, Koch, Die Pflanz., p. 44 (1857); Buckton, Mon. Brit. Aphid., II, p. 12 (1877); Davis, Ent. News, XXI, p. 245 (1910); Patch, Maine Agr. Expt. St. Bull., 202, p. 171 (1912); Essig, Pomona Jl. Ent., IV, p. 793 (1912); Patch, Science, XLII, p. 164 (1915); Davidson, Jl. Econ. Ent., X, p. 350 (1917); Takahashi, Aphididae of Formosa, pt. 1, p. 33 (1921); pt. 2, p. 90 (1923); Moreira, Inst. Biol. Defesa Agr., Bol. 2, p. 21 (1925); Laing, Entom., LVIII, p. 123 (1925); Hall, Minist. Agr. Egypt, Tech. Sc. Serv. Bull., 68, p. 33 (1926); Okamoto and Takahashi, Ins. Mats., I, p. 135 (1927); Theobald, Plant Lice Brit. II, p. 60 (1927); Nevsky, Mon. Aphid. Middle Asia, p. 208 (1929); Hori, Hokkaido Agr. Expt. St., Rept. 23, p. 131 (1929).

Siphocoryne nymphaeae, Theobald, Bull. Ent. Res., VI, p. 118 (1915); Das, Mem. Ind. Mus., VI, p. 191 (1918); Swain, Univ. Calif. Pub. Tech. Bull. Ent., III, p. 133 (1919).

Siphonaphis nymphaeae, van der Goot, Beitr. Kennt. Holland. Blattl., p. 239

(1915); Contr. Fauna Indes Neerl., I, 3, p. 69 (1917).

Hosts.—Limnanthemum indicum, Sagittaria sagittifolia, Prunus communis, P. persica, Salvinia natans, Nymphaea sp., Nelumbo nucifera, Pistia stratiotes var. asiatica.

Distr.—Taihoku, Kannonsan, Suisha, Domon. Japan, Corea, China, India, Java, Europe, Africa, New Zealand, North America, South America, etc.

Rhopalosiphum pseudobrassicae Davis.

Aphis pseudobrassicae, Davis, Can. Ent., XLVI, p. 231 (1914); Purdue Univ. Agr. Expt. St. Bull. 185, p. 1 (1916); Maki, Agr. Expt. St. Formosa, Bull. 108, p. 28 (1916); Swain, Univ. Calif. Pub. Tech. Bull. Ent. III, p. 122 (1919); Hall, Minist. Agr. Egypt, Tech. Sc. Serv., Bull. 68, p. 24 (1926).

Siphocoryne pseudobrassicae, van der Goot, Contr. Fauna Indes Neerl., I, 3, p. 64 (1917); Theobald, Bull. Ent. Res., VIII, p. 289 (1918).

Rhopalosiphum pseudobrassicae, Takahashi, Aphididae of Formosa, pt. 1, p. 33 (1921); pt. 2, p. 91 (1923); Blanchard, Physis, VIII, p. 18 (1925); Okamoto and Takahashi, Ins. Mats., I, p. 135 (1927); Hori, Hokkaido Agr. Expt. St. Rept., 23, p. 134 (1929).

Siphocoryne indobrassicae, Das, Mem. Ind. Mus., VI, p. 188 (1918).

Rhopalosiphum papaveris, Takahashi, Aphididae of Formosa, pt. 1, p. 34 (1921).

Hosts.—Brassica spp., Raphanus spp., Capsella bursa-pastoris, Chrysanthemum coronarium, Ranunculus sceleratus, Papaver somniferum.

Distr.—Very common over the lowlands in Formosa. Hokoto, Loochoo, Corea, Japan, China, Java, India, Sumatra, Africa, North America, South America.

Rhopalosiphum papaveris Takah. considered as a synonym of *R. avenae* Fab. in my former report (Aphididae of Formosa, pt. 2, p. 34) is identical with *R. pseudobrassicae* Davis, but not with *R. avenae*.

Rhopalosiphum lahorensis Das.

Stephensonia lahorensis, Das, Mem. Ind. Mus., VI, p. 175 (1918).

Rhopalosiphum lahorensis, Takahashi, Aphididae of Formosa, pt. 1, p. 36 (1921); pt. 2, p. 92 (1923); pt. 3, p. 39 (1924); Hall, Minist. Agr. Egypt, Tech. Sc. Serv., Bull. 68, p. 33 (1926); Theobald, Entom., LXI, p. 49 (1928); Plant Lice Brit., III, p. 339 (1929).

Neaphis viridis, Nevsky, Zool. Anz., Wasmann-Festband, p. 206 (1929);

Mon. Aphid. Middle Asia, p. 212 (1929).

Hosts.—Artemisia vulgaris var. indica, Chrysanthemum sinensis, Siegesbeckia orientalis.

Distr.—Taihoku, Hokoto. Corea, India, Egypt, Middle Asia, England.

Rhopalosipum artemisiae Del Guercio (Redia, IX, p. 175) may be identical with this species.

Genus **Micraphis** n.g.

Apterous form distinctly shrinked on the dorsum as in *Cavariella*, without lateral and dorsal tubercles and eminent hairs. Frontal tubercles wanting. Antennae 5 or 6-jointed; distal part of the last joint long; sensoria circular or subcircular. Eyes normal. Cornicles long, cylindrical, scarcely or slightly swollen on the distal part, imbricated. Cauda, particularly in the apterous form, large, conical. Wings and legs normal.

Genotype.—*Anuraphis artemisiae* Takah.

This genus is most related to *Rhopalosiphum* Koch, but differs in the shrinked dorsum of the apterous form.

Micraphis artemisiae Takah.

Cerosipha sp., Takahashi, Aphididae of Formosa, pt. 2, p. 42 (1923).

Anuraphis artemisiae, Takahashi, Aphididae of Formosa, pt. 3, p. 46 (1924).

Host.—Artemisia capillaris.

Distr.—Taihoku.

Genus **Cavariella** Del Guercio.

Key to species.

(1) Dorsal horn very small, not distinct, antennae 6-jointed.....*C. japonica.*

— Dorsal horn distinct, antennae 5 or 6-jointed.....(2)

(2) Cornicles very stout, dorsal horn of the apterous form very stout, antennae 6-jointed.....*C. bicaudata.*

— Cornicles slender, dorsal horn of the apterous form elongated, antennae usually 5-jointed. .....(3)

(3) Apterous form milk white, with the horn as long as or a little shorter than the cornicle; horn of the alate form sometimes nearly as long as the cauda. .....*C. araliae.*

— Apterous form green, with the horn usually distinctly shorter than the cornicle; horn of the alate form shorter than the cauda.....*C. neocapreae.*

Cavariella japonica Essig et Kuw.

Siphocoryne japonica, Essig and Kuwana, Proc. Calif. Acad. Sc. 4th ser., VIII, p. 66 (1918).

Cavariella japonica, Takahashi, Aphididae of Formosa, pt. 4, p. 28 (1925).

Host.—Salix sp.

Distr.—Sankakuho. Japan.

Cavariella bicaudata Essig et Kuw.

Siphocoryne bicaudata, Essig and Kuwana, Proc. Calif. Acad. Sc., 4th ser., VIII, p. 64 (1918).

Cavariella bicaudata, Takahashi, Aphididae of Formosa, pt. 1, p. 36 (1921); pt. 2, p. 94 (1923); Okamoto and Takahashi, Ins. Mats., I, p. 136 (1927); Hori, Hokkaido Agr. Expt. St. Rept., 23, p. 149 (1929).

Hosts.—Salix warburgi, S. sp.

Distr.—Taihoku. Japan, Corea.

Cavariella araliae Takah.

Aphididae of Formosa, pt. I, p. 37 (1921); pt. 2, p. 35, p. 93 (1923); Proc. Nat. Hist. Soc. Fukien Christ. Univ., III, Reprint, p. 1, (1930).

Hosts.—Aralia spp., Agalma lutchuense.

Distr.—Taihoku, Shinten, Urai, Kannonzan, Riyohen, Karapin, Baikei, Suisha, Taichu, Kanshirei. Japan, China.

Cavariella neocapreae Takah.

Aphididae of Formosa, pt. 1, p. 37 (1921); pt. 2, p. 36. p. 93 (1923); pt. 3, p. 40 (1924).

Hosts.—Salix warburgi, S. sp.

Distr.—Taihoku, Suo, Giran, Koheki. Japan.

Genus **Vesiculaphis** Del Guercio.

Vesiculaphis caricis Fullaway.

Toxoptera caricis, Fullaway, Ann. Rept. Hawaii. Agr. Expt. St., 1909, p. 32 (1910); Phillips and Davis, U.S. Dept. Agr. Tech. ser., no. 25, pt. 1, p. 8 (1912).

Vesiculaphis caricis, Del Guercio, Redia, VII, p. 464 (1911); Takahashi, Aphididae of Formosa, pt. 1, p. 30 (1921); pt. 2, p. 90 (1923); Uye, Insect World, XXIX, p. 219 (1925).

Toxoptera shichito, Uye, Insect World, XXVII, p. 3 (1923).

Toxoptera rhododendroni, Uye, Insect World, XXVII, p. 3 (1923).

Host.—Cyperus rotundus.

Distr.—Taihoku. Japan, Hawaii.

Tribe Macrosiphini.

Key to genera.

(1) Frontal tubercles, particularly in the apterous form, imbricated or with many spinules on the mesal side, sometimes converging or with a mesal tubercle. .....(6)

— Frontal tubercles not imbricated, always diverging, without spinules. .....(2)

(2) Apterous form with prominent capitate hairs. .....*Capitophorus.*

— Apterous form without prominent capitate hairs. .....(3)

(3) Cornicles not swollen, usually distinctly imbricated, often reticulated. .....(4)

— Cornicles swollen, usually not distinctly imbricated except on the tip. .....(5)

(4) Cornicles longer than the cauda. .....*Macrosiphum.*

— Cornicles as long as the cauda. .....*Macrosiphoniella.*

(5) Cornicles longer than the cauda. .....*Amphorophora.*

— Cornicles as long as the cauda. .....*Megoura.*

(6) Wings with the radial sector strongly curved or united with the upper branch of media and eminently infuscated along the veins; hind wings sometimes reduced. .....(7)

— Wings and veins normal, sometimes narrowly infuscated along the veins...(8)

(7) Hind wings much reduced in size, without cubitus; radial sector fused with the media, forming a closed cell.....*Pentalonia.*

— Hind wings not much reduced; radial sector strongly curved, but not fused with the media. .....*Fullawayella.*

(8) Frontal tubercles with a tubercle on the mesal side. .....(9)

— Frontal tubercles converging or diverging, with no tubercle.....(10)

(9) Hind wings with an oblique, cornicles sometimes with prominent setae..... ..... *Trichosiphonaphis*

— Hind wings with 2 obliques, cornicles without setae. .....*Phorodon.*

(10) Frontal tubercles often converging or strongly convex on the mesal side; apterous form usually lacking sensoria on the 3rd antennal joint, and if they are present, frontal tubercles converging or dorsum of the apterous form shrinked or reticulated. .....*Myzus.*

— Frontal tubercles diverging, sometimes strongly convex; apterous form always with sensoria on the 3rd antennal joint. .....*Acyrthosiphon.*

Genus **Macrosiphum** Pass.

Key to species.

(1) Cornicles always entirely or mostly black, reticulated on the distal part....(2)

— Cornicles black or not, not reticulated. .....(11)

(2) The 3rd antennal joint of the apterous form with sensoria near the base or on the basal half. .....(4)

— The 3rd antennal joint of the apterous form with sensoria scattered over the whole length or except on the apical small part. .....(3)

(3) Cauda yellow, sensoria prominently protruding, the 3rd antennal joint much longer than the 4th and 5th taken together. .....*M. formosanum.*

— Cauda black, sensoria not so prominently protruding, the 3rd antennal joint nearly as long as or shorter than the 4th and 5th taken together..... ..... *M. gobonis.*

(4) Cauda of the apterous form black, the 3rd antennal joint of the apterous form with about 13–15 sensoria scattered nearly on the basal half. .... *M. lactucicola.*

— Cauda not black.....(5)

(5) Cornicles reticulated always over the distal one-third. .....*M. debilis.*

— Cornicles reticulated less than the distal one-third in the apterous form....(6)

(6) Cornicles black, paler on the tip, femora and tibiae with many sensoria in the viviparous female. .....*M. smilacicola.*

— Cornicles not paler at the tip, legs with no sensoria on the femora and tibiae in the viviparous female, ...(7)

(7) Cornicles paler on the basal part, the 1st antennal joint very large, completely twice or more times as long as the 2nd. .....*M. clematidis.*

— Cornicles entirely black, the 1st antennal joint not so large. .....(8)

(8) Cornicles somewhat reticulated only in the alate form. ...*M. rubiformosanum.*

— Cornicles always distinctly reticulated. .....(9)

(9) Sensoria on the 3rd antennal joint not arranged in a single row. .... *M. rosae ibarae.*

— Sensoria on the 3rd antennal joint arranged in a row. .....(10)

(10) Apterous form black on the dorsum of abdomen.....*M. smilacifoliae.*

— Apterous form not black on the dorsum.....*M. granarium.*

(11) The 4th antennal joint with sensoria in the alate form. .....(12)

— The 4th antennal joint always lacking sensoria, conicles black, somewhat reticulated in the alate form.....*M. rubiformosanum.*

(12) Cornicles a little longer than the cauda; apterous form with no protuberance at the middle of the front, but with 1–3 sensoria on the 3rd antennal joint; alate form with sensoria nearly in a row on the 3rd and 4th antennal joints, wings somewhat infuscated along the veins. .....*M. evodiae.*

— Cornicles much longer than the cauda; apterous form with a protuberance at the middle of the front, lacking sensoria on the 3rd antennal joint; alate form with sensoia scattered on the 3rd antennal joint, wings not infuscated. ..... *M. itoe.*

Macrosiphum formosanum Takah.

Aphididae of Formosa, pt. 1, p. 6 (1921); pt. 2, p. 74 (1923); pt. 3, p. 27 (1924); Trans. Nat. Hist. Soc. Formosa, XVI, p. 184 (1926); Okamoto and Takahashi, Ins. Mats. I, p. 130 (1927).

Macrosiphum picridis, Maki (nec. L.), Agr. Expt. St. Formosa, Bull. 108, p. 9 (1916).

Hosts.—Sonchus oleracea, Lactuca brevirostris, L. debilis, L. formosana, L. scariola, L. gracilis.

Distr.—Practically over the whole area. Botel Tobago, Loochoo, China, Corea, Japan.

Macrosiphum gobonis Mats.

Jl. Coll. Agr. Sapporo, VII, p. 395 (1917); Takahashi, Aphididae of Formosa, pt. 1, p. 5 (1921); pt. 2, p. 69 (1923); pt. 3, p. 21 (1924); Okamoto and Takahashi, Ins. Mats., I, p. 130 (1927); Hori, Hokkaido Agr. Expt. St. Rept., 23, p. 59 (1929).

Macrosiphum solidaginis, Maki (nec. Fab.), Agr. Expt. St. Formosa, Bull. 108, p. 11 (1916).

Macrosiphum ambrosiae, Takahashi (nec. Thomas), Aphididae of Formosa, pt. 2, p. 12 (1923).

Hosts.—Arctium lappa, Blumea balsamifera, Chrysanthemum coronarium, Cirsium japonicum, C. kawakamii, Gnaphalium multiceps, Saussurea affinis.

Distr.—Over the whole area in Formosa. Botel Tobago, Loochoo, China, Japan, Corea, Kaibato (Saghalin).

Macrosiphm ambrosiae Takah. may be a form of this species.

Macrosiphum lactucicola Strand.

Acta Univ. Latv., XX, p. 22 (1929).

Macrosiphum sp., Takahashi, Aphididae of Formosa, pt. 4, p. 11 (1925).

Hosts.—Solidago virga- aurea, Lactuca oldhami.

Distr.—Sankakuho, Tattaka.

Closely allied to *M. gobonis* Mats., but differs in that the 3rd antennal joint of the apterous form is much shorter than the 4th and 5th taken together and is provided with about 15–19 sensoria.

Macrosiphum rosae ibarae Mats.

Macrosiphum ibarae, Matsumura, Jl. Coll. Agr. Sapporo, VII, p. 397 (1917); Takahashi, Trans. Nat. Hist. Soc. Formosa, XX, p. 320 (1930).

Macrosiphum rosae, Maki (nec. L.), Forest Expt. St. Formosa, Spec. Rept., 1, p. 31. (1915); Takahashi, Aphididae of Formosa, pt. I, p. 8 (1921); pt. 2, p. 71 (1923); Okamoto and Takahashi, Ins. Mats., I, p. 131 (1927); Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 247 (1929).

Hosts.—Rosa spp.

Distr.—Taihoku, Kagi, Taihezan. Loochoo, Japan, Corea, China, Sumatra.

Macrosiphum granarium Kirby.

Aphis granaria, Kirby, Trans. Linn. Soc., IV, p. 238 (1798) (not available).

Siphonophora granaria, Buckton, Mon. Brit. Aphid., I, p. 114 (1875).

Macrosiphum granarium, Schouteden, Ann. Soc. Ent. Belg., XLV, p. 114 (1901); Washburn, Univ. Minnesota Agr. Expt. St. Bull., 108, p. 257 (1908); Theobald, Jl. Econ. Biol., VIII, p. 58 (1913); Bull. Ent. Res., IV, p. 317 (1914); van der Goot, Beitr. Kennt. Holland. Blattl., p. 66 (1915); Phillips, Jl. Agr. Res., VII, p, 463 (1916); van der Goot, Contr. Fauna Ind. Neerl., I, 3, p. 13 (1917); Das, Mem. Ind. Mus., VI, p. 162 (1918); Takahashi, Aphididae of Formosa, pt. 2, p. 74 (1923); Theobald, Plant Lice Brit., I, p. 70 (1926); Opmanis, Beitr. Aphid. Lettl., p. 396 (1928); Hori, Hokkaido Agr. Expt. St. Rept., 23, p. 62 (1929).

Illinoia granarium, Soliman, Univ. Calif. Pub. Ent., IV, p. 131 (1927).

Aphis cerealis, Kaltenbach, Mon., p. 16 (1843).

Siphonophora cerealis, Koch, Die Pflanz., p. 186 (1857).

Macrosiphum miscanthi, Takahashi, Aphididae of Formosa, pt. 1, p. 8 (1921).

M. alopecuri Takahashi, Aphididae of Formosa, pt. 1, p. 9 (1921); pt. 3, p. 17 (1924).

Macrosiphum sp., Takahashi, Aphididae of Formosa,pt. 3, p. 20 (1924).

Hosts.—Setaria glauca, Miscanthus sp., Alopecurus aequalis, Oryza sativa.

Distr.—Taihoku, Taichu, Shinten, Hattsukan. Cosmopolitan.

Macrosiphum smilacifoliae Takah.

Aphididae of Formosa,pt. 1, p. 12 (1921); pt. 2, p. 72 (1923).

Macrosiphum granarium, Takahashi (nec. Kirby), Aphididae of Formosa, pt. 2, p. 14 (1923).

Hosts.—Smilax china, Miscanthus sp.

Distr.—Taihoku, Shinten, Suisha.

This species is very closely allied to *M. granarium* Kirby, but differs from it in the following characters of the apterous viviparous female: (1) Body chitinized and black on the dorsum of abdomen. (2) Cauda narrower, with no distinct constriction, tapering. (3) Cornicles longer.

The specimens on Miscanthus I described under the name of *M. granarium* Kirby agree well with those on Smilax, and this species seems to migrate between these plants. *Macrosiphum miscanthi* Takah. is a synonym of *M. granarium* Kirby and *Macrosiphum* sp. on Lactuca (Aphididae of Formosa, pt. 3, p. 17) may be a form of *M. smilacifoliae* Takah.

Macrosiphum debilis Takah.

Aphididae of Formosa, pt. 2, p. 11, p. 73 (1923).

Host.—Lactuca debilis.

Distr.—Taihoku.

Macrosiphum smilacicola Takah.

Aphididae of Formosa, pt. 3, p. 15 (1924).

Host.—Smilax stenopetala.

Distr.—Funkiko (Arisan).

Macrosiphum clematidis Takah.

Aphididae of Formosa, pt. 5, p. 2 (1927).

Macrosiphum sp., Aphididae of Formosa, pt. 3, p. 19 (1924).

Host.—Clematis gouriana.

Distr.—Taihoku, Batoran, Tarowan.

Macrosiphum rubiformosanum Takah.

Aphididae of Formosa, pt. 5, p. 3 (1927).

Macrosiphum rosae L. ?, Takahashi, Aphididae of Formosa, pt 2, p. 13 (1923).

Hosts.—Rubus spp.

Distr.—Taihoku, Hakumo, Kanshirei, Batoran, Taihezan.

Macrosiphum evodiae Takah.

Trans. Nat. Hist. Soc. Formosa, XIX, p. 92 (1929).

Host.—Evodia triphylla.

Distr.—Suisha.

This aphid is not a typical species of the genus, resembling *Megoura*, but the cornicles are not swollen and are a little longer than the cauda.

Macrosiphum itoe Takah.

Aphididae of Formosa, pt. 4, p. 11 (1925).

Host.—Rhododendron lasiostylum.

Distr.—Tattaka.

The apterous form has no sensoria on the 3rd antennal joint, but possesses a distinct median protuberance on the front; and the species is not a typical *Macrosphum*, but now I place it here.

Genus **Macrosiphoniella** Del Guercio.

Key to species.

(1) Dark reddish brown; the 3rd antennal joint of the apterous form with over 15 sensoria nearly over the whole length; the 4h joint of the alate form with sensoria; cornicles not constricted at the base.....*M. sanborni.*

— Green or black; the 3rd antennal joint of the apterous form with some sensoria on the basal half; the 4th joint of the alate form without sensoria; cornicles constricted at the base.....(2)

(2) Black; cauda with no distinct constriction; cornicles usually a little longer than the cauda, reticulated on the distal half.....*M. formosartemisiae.*

— Green; cauda with a distinct constriction; cornicles slightly shorter than the cauda, reticulated on the distal two-thirds. .....*M. yomogifoliae.*

Macrosiphoniella sanborni Gillette.

Macrosiphum sanborni, Gillette, Can. Ent., XL, p. 65 (1908); Davis, Jl. Econ. Ent., IV, p. 330 (1911); Gillette, Jl. Econ. Ent., IV, p. 385 (1911); Fullaway, Ann. Rept. Agr. Expt. St. Hawaii, 1909, p. 26 (1910); Maki, Forest Expt. St. Formosa, Spec. Rept. 1, p. 32 (1915); Swain, Univ. Calif. Pub. Tech. Bull. Ent. III. p. 69 (1919); Das, Mem Ind. Mus., VI, p. 163 (1918).

Macrosiphoniella sanborni, van der Goot, Contr. Fauna Indes Neerl., I, 3, p. 36 (1917); Takahashi, Aphididae of Formosa, pt. 1, p. 16 (1921); pt. 2, p. 77 (1923); Theobald, Plant Lice Brit., I, p. 149 (1926); Hall, Minist. Agr. Egypt, Tech. Sc. Serv. Bull., 68, p. 38 (1926); Soliman, Univ. Calif. Pub., Ent., IV, p. 136 (1927); Hori, Hokkaido Agr. Expt. St. Rept., 23, p. 75 (1929).

Macrosiphum chrysanthemi, Sanborn, Kansas Univ. Sc. Bull., III, p. 75 (1904); Del Guercio, Redia, VII, p. 332 (1911); Theobald, Bull. Ent. Res., VI, p. 112 (1915); Matsumura, Jl. Coll. Agr. Sapporo, VII,, p. 398 (1917).

Macrosiphoniella chrysanthemi, Blanchard, Physis, V, p. 202 (1922); Nevsky, Mon. Aphid. Middle Asia, p. 106 (1929).

Macrosiphum bedfordi, Theobald, Bull. Ent. Res., IV, p. 318 (1914).

Macrosiphum nishigaharae, Essig and Kuwana, Proc. Calif. Acad. Sc., 4th ser., VIII, p. 50 (1918).

Host.—Chrysanthemum sinense.

Distr.—Throughout the range of the host in Formosa. Cosmopolitan.

Macrosiphoniella yomogifoliae Shinji.

Macrosiphum yomogifoliae, Shinji, Dobuts. Zasshi, XXXIV, p. 788 (1922).

Macrosiphoniella tanacetaria, Takahashi, (nec. Kalt.), Aphididae of Formosa, pt. 1, p. 17 (1921); pt. 2, p. 78 (1923).

(Wingless viviparous female) Green, somewhat covered with white powder. Antennae with some setae somewhat capitate and shorter than those on the head; the 3rd joint scriate on the distal part, with about 5 rather small circular sensoria nearly in a row near the base; the 4th lacking sensoria; the relative length of joints about as follows: III—34, IV—30, V—25, VI—12 + 38. Cornicles black, slightly

shorter than the cauda, constricted at the base and near the apical part, most narrow near the apical part, reticulated on the distal two-thirds, imbricated on the basal part, about 4 times as long as wide, a little shorter than the 5th antennal joint. Cauda black, usually with 4 pairs of very long lateral bristles and 2 median ones and a distinct constriction.

(Winged viviparous female) The 3rd antennal joint somewhat striate on the distal part, with 19 rather small circular sensoria not in a single row along the whole length except on the basal and distal small portions; the 4th without sensoria; the relative length of joints about as follows: III—40, IV—30, V—28, VI—11+41. Cornicles slightly shorter than the cauda, as in the apterous form in shape, but about 4.6 times as long as wide. Cauda stout, rounded at the apex, with a distinct constriction, 4 pairs of long lateral bristles and 2 median bristles.

Hosts.—Artemisia vulgaris var. indica, Chrysanthemum sinensis.

Distr.—Taihoku, Urai, Tattaka. China, Japan.

This species was formerly recorded by me as *M. tanacetaria* Koch, but is different from it remarkably, and also differs from *M. yomogicola* Mats. in the presence of about 19 sensoria on the 3rd antennal joint of the winged form. Shinji's description is very brief and incomplete, but now I adopt his name.

Macrosiphoniella formosartemisiae Takah.

Aphididae of Formosa, pt. 1, p. 15 (1921); pt. 2, p. 77 (1923); Okamoto and Takahashi, Ins. Mats., I, p. 131 (1927).

Host.—Artemisia capillaris.

Distr.—Taihoku, Chippon, Tarowan, Karenko. Corea, China.

Genus **Acyrthosiphon** Mordvilko.

Closely allied to *Macrosiphum* and *Myzus*, as well as to *Amphorophora*, but differs from *Macrosiphum* and *Amphorophora* in the frontal tubercles provided with many spinules, and from *Myzus* in that the frontal tubercles are always not converging, the 3rd antennal joint of the apterous form is always provided with sensoria and the dorsum is never reticulated nor shrinked.

Key to species.

(1) Apterous form with a blunt median tubercle on the front and about 10 sensoria in a row on the 3rd antennal joint. ..... *A. rosaefoliae.*

— Apterous form without a median tubercle on the front. .....(2)

(2) Cornicles dusky on the distal part.....(3)
— Cornicles entirely black.....(5)
(3) Cornicles slender, imbricated throughout, not swollen. .....(4)
— Cornicles somewhat swollen, a little imbricated at the tip, body pale yellowish white.....*A. takahashii.*
(4) Body yellow or green, winged form with about 27 sensoria not in a single row on the 3rd antennal joint, fore wings distinctly infuscated along the 1st and obliques.....*A. cirsicola.*
— Body green, winged form with about 10 sensoria in a row on the 3rd antennal joint, wings not infuscated. .....*A. pisi.*
(5) Cornicles not swollen, slender; apterous form with 3–5 large sensoria in a row near the base of the 3rd antennal joint. .....*A. perillae.*
— Cornicles somewhat or distinctly swollen, apterous form with 1 or 2 sensoria near the base of the 3rd antennal joint. .....(6)
(6) Red, cornicles somewhat swollen, wings not infuscated. .....*A. paederiae.*
— Green, cornicles distinctly swollen, fore wings infuscated along the 1st and 2nd obliques. .....*A. formosanum.*

Acyrthosiphon pisi Kalt.

Aphis pisi, Kaltenbach, Mon. Pflanz., p. 23 (1843).

Siphonophora pisi, Koch, Die Pflanz., p. 190 (1857); Buckton, Mon. Brit. Aphid., I, p. 134 (1875).

Macrosiphum pisi, Theobald, Jl. Econ. Biol., VIII, p. 134 (1913); Theobald, Bull. Ent. Res., VI, p. 105 (1915); Davis, U. S. Dept. Agr., Bull. 276 (1915); van der Goot, Beitr. Kennt. Holland. Blattl., p. 85 (1915); Maki, Agr. Expt. St. Formosa, Bull. 108, p. 14 (1916); van der Goot, Contr. Fauna Indes Neerl., I, 3, p. 15 (1917); Das, Mem. Ind. Mus., VI, p. 157 (1918); Swain, Univ. Calif. Pub. Tech. Bull., Ent., III, p. 66 (1919); Takahashi, Aphididae of Formosa, pt. 1, p. 10 (1921); Theobald, Plant Lice Brit., I, 127 (1926); Gillette, Ann. Ent. Soc. Amer., XX, p. 348 (1927); Opmanis, Beitr. Kennt. Aphid. Lettl., p. 401 (1928); Hori, Hokkaido Agr. Expt. St., Rept. 23, p. 70 (1929).

Acyrthosiphon pisi, Mordvilko, Faune Russe, Hem., I, p. 83 (1914); Nevsky, Mon. Aphid. Middle Asia, p. 86 (1929).

Illinoia pisi, Campbell, Jl. Agr. Res., XXXII, p. 861 (1926); Patch, Maine Agr. Expt. St., Bull. 337, p. 9 (1927); Soliman, Univ. Calif. Pub. Ent., IV, p. 132 (1927).

Hosts.—Pisum sativum, Myrica rubra.

Distr.—Taihoku, Tattaka. Cosmopolitan.

Acyrthosiphon perillae Takah.

Macrosiphum perillae, Takahashi, Aphididae of Formosa, pt. 3, p. 25 (1924).

Host.—Perilla ocymoides.

Distr.—Shinten.

Acyrthosiphon cirsicola Takah.

Macrosiphum cirsicola, Takahashi, Aphididae of Formosa, pt. 2, p. 10, p. 71 (1923).

Macrosiphum tricholobicola, Strand, Acta Univ. Latv., XX, p. 22 (1929).

Macrosiphum sp., Takahashi, Aphididae of Formosa, pt. 4, p. 10 (1925).

Hosts.—Cirsium japonicum, Petasites tricholobus, Arctium lappa.

Distr.—Taihoku, Sankakuho. Japan.

Macrosiphum tricholobicola Strand may be a form of this species.

Acyrthosiphon rosaefoliae Theob.

Macrosiphum rosaefoliae, Theobald, Bull. Ent. Res. VI, p. 109 (1915); Takahashi, Aphididae of Formosa, pt. 4, p. 9 (1925); Hall, Minist. Agr. Egypt, Tech. Sc. Serv.. Bull. 68, p. 39 (1926); Theobald, Entom., LXII, p. 9 (1929).

Aulacorthum viride, van der Goot, Contr. Fauna Indes Neerl., 1, 3, p. 31 (1917).

Host.—Rosa sp.

Distr.—Tattaka. Java, India, Africa.

Acyrthosiphon paederiae Takah.

Macrosiphum paederiae, Takahashi, Aphididae of Formosa, pt. 1, p. 11 (1921); pt.2, p. 15, p. 73 (1923).

Amphorophora paederiae, Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 251 (1929).

Host.—Paederia tomentosa.

Distr.—Taihoku, Shirin. Loochoo, China, Japan.

Acyrthosiphon formosanum Takah.

Amphorophora formosana, Takahashi, Aphididae of Formosa, pt. 2, p. 30 (1923); Mason, Proc. U.S. Nat. Mus., LXVII, Art. 20, p. 31 (1925); Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 525 (1929).

Host.—Millettia reticulata.

Distr.—Kagi, Chippon, Hokuto, Taihoku, Gyochi.

Acyrthosiphon takahashii Mason.

Amphorophora sp., Takahashi, Aphididae of Formosa, pt. 2, p. 32 (1923).

A. takahashii, Mason, Proc. U.S. Nat. Mus., LXVII, Art. 20, p. 67 (1925).

Host.—Pollia japonica.

Distr.—Rimogan.

Genus **Myzus** Pass.

Key to species.

(1) Distinctly reticulated on the distal parts of cornicles and the dorsum of apterous form. .....(2)

— Not reticulated on the cornicles. .....(3)

(2) Body with long capitate hairs; the 3rd antennal joint of the alate form with about 20-23 sensoria nearly in a single row. .....*M. woodwardiae.*

— Body without long capitate setae; the 3rd antennal joint of the alate form with about 30 or more sensoria scattered. .....*M. polypodicola.*

(3) Apterous form with sensoria on the 3rd antennal joint.....(17)

— Apterous form without sensoria on the 3rd antennal joint. .....(4)

(4) Cornicles short, with some setae. .....*M. momonis.*

— Cornicles without setae. .....(5)

(5) Cornicles of the apterous form entirely black.....(6)

— Cornicles of the apterous form not entirely black. .....(7)

(6) Cornicles of the apterous form slender, longer than the 3rd antennal joint.... ..... *M. malisuctus.*

— Cornicles of the apterous form stout, shorter than the 3rd antennal joint. ... . *M. formosanus.*

(7) Cornicles of the apterous form slender, tapering, not swollen. .....(8)

— Cornicles of the apterous form more or less swollen on the distal part....(12)

(8) Cornicles of the apterous form black on the basal and distal parts, slightly imbricated; wings infuscated along the veins.....*M. arthraxonis.*

— Cornicles of the apterous form black on the distal part at most, well imbricated.....(9)

(9) Frontal tubercles of the apterous form diverging; cornicles of the apterous form nearly as long as the 3rd antennal joint. .....*M. plantagicola* n. sp.

— Frontal tubercles of the apterous form distinctly protruding on the mesal side. .....(10)

(10) Apterous form white, with the cornicles shorter than the 3rd antennal joint. .....*M. boehmeriae.*

— Apterous form green or yellow, with the cornicles longer than the 3rd antennal joint. .....(11)

(11) Cornicles of the apterous form deeply black nearly on the distal half..... ..... *M. varians.*

— Cornicles of the apterous form dusky at the tip. .....*M. siegesbeckicola.*

(12) Cornicles of the apterous form scarcely imbricated, moderately swollen on the distal half.....*M. stellariae.*

— Cornicles somewhat swollen near the tip. .....(13)

(13) The 3rd antennal joint of the alate form with sensoria in a single row..... .....(15)

— The 3rd antennal joint of the alate form with sensoria not in a row.....(14)

(14) The 4th and 5th antennal joints of the alate form lacking secondary sensoria; wings not infuscated; cornicles deeply black on the distal half..... .....*M. varians.**

— The 4th and 5th antennal joints of the alate form with secondary sensoria; fore wings slightly infuscated along the 1st and 2nd obliques; cornicles not black on the distal half.....*M. mushaensis* n. sp.

(15) Cornicles of the apterous form shorter than the 3rd antennal joint. .... *M. boehmeriae.**

— Cornicles of the apterous form longer than the 3rd antennal joint.....(16)

(16) Cornicles very long, slightly imbricated; the 3rd antennal joint of the alate form with about 10 sensoria.....*M. persicae.*

— Cornicles not so long, distinctly imbricated throughout, about 4–4.5 times as long as wide; the 3rd antennal joint of the alate form with about 6–8 sensoria.....*M. hemerocallidis.*

(17) In the apterous form, dorsum not reticulated, frontal tubercles somewhat converging, cornicles black, dilated on the distal half, and the 3rd antennal joint with many sensoria not in a row.....*M. montanus.*

*The cornicles are usually not swollen, but sometimes very slightly swollen near the tip.

— In the apterous form, dorsum somewhat reticulated, frontal tubercles diverging, cornicles dusky at the tip, sometimes slightly swollen near the tip, and the 3rd antennal joint with a sensorium near the base. .....*M. taiwanus.*

Myzus boehmeriae Takah.

Aphididae of Formosa, pt. 2, p. 26 (1923).

Host.—Boehmeria sp.

Distr.—Urai, Rato.

Myzus mushaensis n. sp.

Myzus sakurae, Takahashi (nec. Mats.), Aphididae of Formosa, pt. 4, p. 15 (1925).

Host.—Prunus taiwaniana.

Distr.—Musha, Arisan, Sozan.

Description was given in the former report. Differs from *M. sakurae* Mats. (nec. Hori) in the colour of the cornicles.

Myzus momonis Mats.

Jl. Coll. Agr. Sapporo, VII, p. 402 (1917); Takahashi, Aphididae of Formosa pt. 2, p. 25, p. 80 (1923); pt. 4, p. 14 (1925); Hori, Hokkaido Agr. Expt. St. Rept. 23, p. 94 (1929); Takahashi, Trans. Nat. Hist. Soc. Formosa, XX, p. 274 (1930).

Aphis spinosula, Essig and Kuwana, Proc Calif. Acad. Sc. 4th ser., VIII, p. 77 (1918).

Myzus higansakurae, Monzen, Alumni Soc. Morioka Agr. Forest Coll., Sc. Rept., IV, Reprint, p. 2 (1927); Saito Ho-on Kai Monogr., I, p. 59 (1929).

Myzus sakurae, Hori (nec. Mats.), Hokkaido Agr. Expt. St., Rept., 23, p. 105 (1929).

Myzus sasakii, Takahashi, (nec Mats.), Aphididae of Formosa, pt. 3, p. 103 (1924).

Hosts.—Prunus persica, P. sp.

Distr.—Kappanzan, Tarowan, Baikei, Taichu, Arisan. Japan, China.

On comparing the specimens of *M. higansakurae* Monzen sent me by Monzen with *M. momonis* Mats., it is clear that these are the same thing. *Myzus rarus* Monzen is, according to Hori, also a synonym of the species. The cornicles of this aphid vary in shape and size to some extent.

Myzus formosanus Takah.

Aphididae of Formosa, pt. 2, p. 22 (1923).

Host.—Polygonum chinensis.

Distr.—Taihoku, Tattaka, Batoran, Taihezan.

Myzus malisuctus Mats.

Trans. Sapporo Nat. Hist. Soc., VII, p. 16 (1918); Takahashi, Trans. Nat. Hist. Soc. Formosa, XVII, p. 390 (1927); Hori, Hokkaido Agr. Expt. St. Rept. 23, p. 91 (1929).

Myzus sp., Takahashi, Aphididae of Formosa, pt. 4, 13 (1925).

M. takahashii, Strand, Acta Univ. Latv., XX, p. 22 (1929).

Aphis japonica, Essig and Kuwana, Proc. Calif. Acad. Sc., 4th ser., VIII, p. 70 (1918).

Myzus japonicus, Monzen, Saito Ho-on Kai, Monog., I, p. 53 (1929).

Host.—Malus formosanus.

Distr.—Tattaka. China, Japan.

Myzus varians Davidson.

Jl. Econ. Ent., V, p. 409 (1912); Takahashi, Aphididae of Formosa, pt. 3, p. 29 (1924); pt. 4, p 16 (1925).

Myzus tropicalis, Takahashi, Aphididae of Formosa, pt. 2, p. 24, p. 81 (1923); pt. 3, p. 27 (1924).

Hosts.—Clematis sp., Prunus persica.

Distr.—Taihoku, Shirin, Sozan, Tansui, Tarowan, Kubabo, Riyohen, Karapin. Botel Tobago, Loochoo, Japan, North America.

The specimens on Clematis are smaller, with somewhat curved cornicles.

Myzus persicae Sulz.

Aphis persicae, Sulzer, Abgek. Gesch. Ins., p. 105 (1776) (not available).

Myzus persicae, Buckton, Mon. Brit. Aphid., I, p. 178 (1875); Gillette, Jl. Econ. Ent., I, p. 359 (1908); Fullaway, Ann. Rept. Hawaii. Agr. Expt. St., 1909, p. 28 (1910); Essig, Pomona Jl. Ent., III, p. 598 (1911); Shiraki, Agr. Expt. St. Formosa, Spec. Rept., 8, p. 114 (1913); Patch, Maine Agr. Expt. St. Bull. 233, p. 260 (1914); Das, Mem. Ind. Mus., VI, p. 166 (1918); Takahashi, Aphididae of Formosa, pt. 1, p. 19 (1921); Blanchard, Physis, V, p. 211 (1922); Takahashi,

Aphididae of Formosa, pt. 2, p. 21, p. 78 (1923); pt. 4, p. 56 (1925); Theobald, Plant Lice Brit., I, p. 318 (1926); Hall, Minist. Agr. Egypt, Tech. Sc. Serv., Bull. 68, p. 41 (1926); Knowlton, Can. Ent. LXI, p. 9 (1929); Monzen, Saito Ho-on Kai, Monog., 1, p. 68 (1929); Hori, Hokkaido Agr. Expt. St. Rept., 23, p. 99 (1929).

Myzoides persicae, van der Goot, Tijdschr. Ent., LVI, p. 84 (1913); Beitr. Kennt. Holland. Blattl., p. 170 (1915); Contr. Fauna Indes Neerl., I, 3, p. 48 (1917).

Rhopalosiphum persicae, Matsumura, Jl. Coll. Agr. Sapporo, VII, p. 362 (1917); Swain, Univ. Calif. Pub. Tech. Bull. Ent., III, p. 85 (1919)

Aphis dianthi, Kaltenbach, Mon., p. 42 (1843).

Rhopalosiphum dianthi, Koch, Die Pflanz., p. 42 (1857); Sanborn, Kansas Univ. Sc. Bull., III, p. 66 (1904); Theobald, Bull. Ent. Res., IV, p. 320 (1914); Opmanis, Beitr. Kennt. Aphid. Lettl., p. 412 (1928).

Hosts.—Abelmoschus moschatus, Acer sp., Capsella bursa-pastoris, Chenopodium album, Chrysanthemum sp., Brassica spp., Duranta plumieri, Antirrhinum majus, Hibiscus albomoschus, Ipomaea batatas, Lactuca oldhami, Nicotiana tabacum, Nerium indicum, Papaver somniferum, Polygonum multiflorum, Petasites tricholobus, Pisum sativum, Prunus persica, Psidium guyava, Raphanus spp., Solanum melongena, Sesamum indicum, Stellaria aquatica, Zelkova formosana.

Distr —Over the whole area in Formosa. Loochoo, Hokoto, Japan, China, Corea, India, Europe, North America, South America, etc.

Myzus hemerocallidis Takah.

Aphididae of Formosa, pt. 1, p, 24 (1921); pt. 2, p. 82 (1923).

Host.—Hemerocallis fulva.

Distr.—Taihoku.

Myzus plantagicola n. sp.

Myzus plantagineus, Takahashi (nec. Pass.), Aphididae of Formosa pt. 3, p. 30 (1924).

Host.—Plantago major.

Distr.—Taihoku.

Differs from the description of *Myzus plantagifoliae* Shinji in possessing more sensoria on the antennae and in the colour, and from *M. plantagineus* Pass. in the longer distal part of the last antennal joint. The cauda of the apterous form is stout, with 2 pairs of lateral bristles.

Myzus arthraxonis Takah.

Aphididae of Formosa, pt. 1, p. 22 (1921); pt. 2, p. 83 (1923).

Host.—Arthraxon ciliaris.

Distr.—Taihoku.

Myzus siegesbeckicola Strand.

Myzus sp., Takahashi, Aphididae of Formosa, pt. 4, p. 14 (1925).

M. siegesbeckicola, Strand, Acta Univ. Latv., XX, p. 22 (1929).

Host.—Siegesbeckia orientalis.

Distr.—Taihoku.

Myzus woodwardiae Takah.

Aphididae of Formosa pt. 1, p. 20 (1921); pt. 2, p. 82 (1923).

Hosts.—Woodwardia sp., Polystichum sp.

Distr.—Taihoku, Kannonzan, Takeyama.

Myzus polypodicola Takah.

Aphididae of Formosa. pt. 1, p. 21 (1921); pt. 2, p. 82 (1923); pt. 4, p. 18 (1925).

Macrosiphum polypodicola, Takahashi, Deli Expt. St. Medan. Rept., No. 24, p. 1 (1925).

Hosts.—Dryopteris arida, Polystichum sp.

Distr.—Taihoku, Chippon, Domon, Botel Tobago. Sumatra.

Myzus stellariae Strand.

Amphorophora sp., Takahashi, Aphididae of Formosa, pt. 4, p. 27 (1925).

A. stellariae, Strand, Acta Univ., Latv, XX, p. 22 (1929).

Host.—Stellaria aquatica.

Distr.—Taihoku.

Myzus taiwanus Takah.

Macrosiphum taiwanum, Takahashi, Aphididae of Formosa, pt. 2, p. 16 (1923).

Amphorophora taiwana, Takahashi, Aphididae of Formosa, pt. 3, p. 39 (1924); Trans. Nat. Hist. Soc. Formosa, XIX, p. 527 (1929).

Host.—Campanumoea javanica.

Distr.—Kanshirei.

Myzus montanus Takah.

Aphididae of Formosa, pt. 4, p. 17 (1925).

Host.—Astilbe longicarpa.

Distr.—Sankakuho, Arisan, Karapin, Shinsuiei, Taihezan.

Genus **Phorodon** Pass.

Key to species.

(1) Tubercle on the frontal tubercles longer than wide and cornicles longer than the 3rd antennal joint in the apterous form.....*P. humuli.*

— Tubercle on the frontal tubercles wider than long and cornicles as long as or shorter than the 3rd antennal joint in the apterous form. .....*P. menthae.*

Phorodon humuli Pass.

Aphis humuli, Schrank, Fn. Boica., II, 110, 1199 (1801) (not available); Kaltenbach, Mon., p. 36 (1843); Koch, Die Pflanz., p. 114 (1857); Remisch, Zeits. Insektenbiol., VII, p. 240, p. 282 (1911).

Phorodon humuli, Buckton, Mon. Brit. Aphid., I, p. 166 (1875); Thomas, Nat. Hist. Illinois, Bull., II, p. 9 (1878); Riley, Ins. Life, I, p. 70, p. 130 (1888); Clarke, Univ. Calif. Agr. Expt. St., Bull. 160 (1904); van der Goot, Beitr. Kennt. Holland. Blattl., p. 132 (1915); Hawley, Cornell Univ. Agr. Expt. St., Mem. 15, p. 202 (1918); Swain, Univ. Calif. Pub. Tech. Bull. Ent., III, p. 79 (1919); Takahashi, Aphididae of Formosa, pt. 1, p. 27 (1921); pt. 2, p. 84 (1923); Theobald, Plant Lice Brit., I, p. 273 (1926); Okamoto and Takahashi, Ins. Mats., I, p. 135 (1927); Opmanis, Acta Univ. Latv., XVIII, p. 25 (1928); Knowlton, Can. Ent., LXI, p. 11 (1929), Hori, Hokkaido Agr. Expt. St. Rept. 23, p. 78 (1929).

Phorodon asacola, Matsumura, Jl. Coll. Agr. Sapporo, VII, p. 405 (1917).

P. cannabis, Das, Mem. Ind. Mus., VI, p. 169 (1918).

Host.—Humulus japonicus.

Distr.—Taihoku, Shirin. Japan, Corea, India, Europe, North America.

Phorodon menthae Buckton.

Siphonophora menthae, Buckton, Mon. Brit. Aphid., I, p. 120 (1875).

Phorodon menthae, van der Goot, Beitr. Kennt. Holland. Blattl., p. 134 (1915); Theobald, Plant Lice Brit., I, p. 278 (1926); Hori, Hokkaido Agr. Expt. St. Rept. 23, p. 80 (1929); Nevsky, Mon. Aphid. Middle Asia, p. 148 (1929).

Myzus menthae, Takahashi, Aphididae of Formosa, pt. 2, p. 22 (1923).

Host.—Mentha arvensis var. vulgaris.

Distr.—Taihoku. Japan, Middle Asia, Europe.

Genus **Trichosiphonaphis** Takah.

Trichosiphonaphis polygoniformosanus Takah.

Myzus polygoniformosanus, Takahashi, Aphididae of Formosa, pt. 1, p. 18 (1921).

Trichosiphonaphis polygoniformosanus, Takahashi, Proc. Ent. Soc. Wash., XXIV, p. 205 (1922); Aphididae of Formosa, pt. 2, p. 19, p. 83 (1923).

Hosts.—Lonicera japonica, Polygonum perfoliatum.

Distr.—Taihoku, Shinten, Sozan, Urai, Kagi, Batoran. Japan.

Macrosiphum lonicerae Uye (Insect World, XXVII, p. 4) is perhaps a synonym of this species.

Genus **Amphorophora** Buckton.

Key to species.

(1) Cornicles distinctly reticulated on the distal part.....*A. indica.*

— Cornicles not reticulated. .....(2)

(2) Cornicles very long, slender, longer than the abdomen, somewhat swollen on the distal part, black, paler on the base. .....*A. neoartemisiae.*

— Cornicles not so long, green, dusky on the distal part, swollen about the middle or on the distal half. .....(3)

(3) Cornicles strongly swollen, the apterous form with no sensoria on the 3rd antennal joint. .....*A. viburni.*

— Cornicles moderately swollen, the apterous form with many sensoria on the 3rd antennal joint. .....*A. oleraceae.*

Amphorophora oleraceae van der Goot.

Rhopalosiphum oleraceae, van der Goot, Contr. Fauna Indes. Neerl., I, 3, p. 40 (1917).

Amphorophora oleraceae, Takahashi, Aphididae of Formosa, pt. 1, p. 28 (1921); pt. 2, p. 84 (1923); pt. 3, 36 (1924); Mason. Proc. U.S. Nat. Mus. LXVII, Art. 20, p. 46 (1925).

Amphorophora sonchifoliae, Takahashi, Aphididae of Formosa, pt. 2, p. 31, p. 85 (1923).

Hosts.—Sonchus oleracea, S. arvensis, Lactuca debilis.

Distr.—Taihoku, Kannonsan, Kanshirei. Loochoo, Japan, Java.

Amphorophora indica van der Goot.

Rhopalosiphum indicum, van der Goot, Rec. Ind. Mus., XII, p. 2 (1916); XIII, p. 176 (1917); Essig and Kuwana, Proc. Calif. Acad. Sc., 4th ser., VIII, p. 55 (1918).

Amphorophora indica, Takahashi, Aphididae of Formosa, pt. 1, p. 28 (1921); Japanese Aphididae, 1, p. 21 (1921); Aphididae of Formosa, pt. 2, p. 87 (1923); pt. 3, p. 107 (1924); Okamoto and Takahashi, Ins. Mats., I, p. 132 (1927).

Rhopalosiphum hemerocallidis, Matsumura, Trans. Sapporo Nat. Hist. Soc., VII, p. 12 (1918).

Rhopalosiphum miniatum, Matsumura, Trans. Sapporo Nat. Hist. Soc., VII, p. 12 (1918).

Nectarosiphum mitsubautsugii, Shinji, Dobuts. Zasshi, p. 308 (1923).

Amphorophora essigwanai, Mason, Pro. U.S. Nat. Mus., LXVII, Art. 20, p. 29 (1925).

Host.—Hemerocallis aurantiaca.

Distr.—Arisan, Funkiko, Kappanzan. Japan, Corea, India.

Amphorophora viburni Takah.

Aphididae of Formosa, pt. 4, p. 23 (1925).

Hosts.—Viburnum arboricolum, Mahonia morissonensis.

Distr.—Tattaka.

Amphorophora neoartemisiae Takah.

Macrosiphum neoartemisiae, Takahashi, Aphididae of Formosa, pt. 1, p. 13 (1921); pt. 2, p. 75 (1923); pt. 3, p. 24 (1924).

Titanosiphon neoartemisiae, Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 247 (1929).

T. bellicosum, Nevsky, Ent. Mitt., XVII, p. 189 (1928); Mon. Aphid. Middle Asia, p. 93 (1929).

Host.—Artemisia capillaris.

Distr.—Taihoku, Karenko, Shirin. Middle Asia.

Genus **Megoura** Buckton.

Megoura citricola van der Goot.

Macrosiphoniella citricola, van der Goot, Contr. Fauna Indes Neerl., I, 3, p. 34 (1917); Takahashi, Aphididae of Formosa, pt. 1, p. 14 (1921); pt. 2, p. 76 (1923).

Megoura citricola, Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 252 (1929).

M. jacobsoni, Mason, Suppl. Ent., XV, p. 88 (1927).

Hosts.—Thea japonica, Cinnamomum camphora, Murraya exotica, Lasianthus sp., Ficus obscura, Bridelia ovata.

Distr.—Taihoku, Urai, Toyen, Kappanzan, Chippon, Kanshirei. Loochoo, Japan, Java, Sumatra, Singapore, China.

In Formosa this species has not been detected on Citrus.

Genus **Fullawayella** Del Guercio.

Key to species.

(1) Frontal tubercles distinctly imbricated and projecting on the mesal side....(2)

— Frontal tubercles slightly imbricated and somewhat convex on the mesal side.....*F. katoi.*

(2) Apterous form black, alate form with secondary sensoria on the 5th antennal joint. .....*F. formosana.*

— Apterous form dark reddish brown, alate form without secondary sensoria on the 5th antennal joint.....*F. violae.*

Fullawayella katoi Takah.

Amphorophora katoi, Takahashi, Aphididae of Formosa, pt. 4, p. 25 (1925).

Host.—Polypodium elliptica.

Distr.—Kagi.

A reexamination of the types shows claerly that *Fullawayella*, not *Amphorophora*, is the genus represented.

Fullawayella violae Perg.

Rhopalosiphum violae, Pergande, Can. Ent. XXXII, p. 29 (1900); Sanborn, Kansas Univ. Sc. Bull., III, p. 64 (1904); Essig, Pomona Coll. Jl. Ent., I, p. 4 (1909); Davidson, Jl. Econ. Ent., II, p. 303 (1909); Swain, Univ. Calif. Pub. Tech. Bull. III, p. 86 (1919).

Neotoxoptera violae, Theobald, Bull. Ent. Res., VI, p. 131 (1915).

Fullawayella violae, Baker, Bull. Ent. Res., X, p. 46 (1919); Takahashi, Aphididae of Formosa, pt. 1, p. 29 (1921).

Host.—Viola sp.

Distr.—Taihoku. North America, Africa.

Fullawayella formosana Takah.

Aphididae of Formosa, pt. 1, p. 29 (1921); pt. 2, p. 33, p. 89 (1923); pt. 3, p. 107 (1924).

Micromyzus formosanus, Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 251 (1929).

Hosts.—Allium scorodoprasum var. viviparum, A. fistulosum.

Distr.—Taihoku, Shinten, Toyen, Batoran, Shikikun. Japan.

Genus **Pentalonia** Coq.

Pentalonia nigronervosa Coq.

Ann. Soc. Ent. Fr., ser. 3, VII, p. 260 (1859); Wilson, Jl. Econ. Ent., II, p. 346 (1909); Fullaway, Ann. Rept. Hawaii. Agr. Expt. St., 1909, p. 29 (1910); Shiraki, Agr. Expt. St. Formosa, Spec. Rept., 8, p. 129 (1913); Maki, Forest Expt. St. Formosa, Spec. Rept., 1, p. 34 (1915); Baker, Bull. Ent. Res., X, p. 46 (1919); Swain, Univ. Calif. Pub. Tech. Bull. Ent., III, p. 78 (1919); Takahashi, Aphididae of Formosa, pt. 1, p. 30 (1921), pt. 2, p. 89 (1923); Moreira, Inst. Biol. Defesa Agr., Bol. 2, p. 28 (1925); Theobald, Plant Lice Brit., I, p. 361 (1926).

Hosts.—Musa spp., Alpinia speciosa.

Distr.—Occurs over practically the whole lowlands in Formosa. Botel Tobago, Loochoo, Philippine, India, Sumatra, Australia, Hawaii, North America, South America, Bermuda, Jamaica, Africa, etc.

Genus **Capitophorus** van der Goot.

Key to species.

(1) Cornicles swollen near the tip. .....*C. hippophaes.*
— Cornicles not swollen.....(2)
(2) Apterous form with long capitate hairs over the whole dorsum and distinct capitate hairs on the 3rd antennal joint. .....(3)
— Apterous form with long capitate hairs not over the whole dorsum, and without them on the 3rd antennal joint. .....(4)
(3) The 3rd antennal joint of the apterous form with 1–3 rather short or moderate capitate hairs. .....*C. formosartemisiae.*
— The 3rd antennal joint of the apterous form with about 5 moderate or rather long capitate hairs.....*C. takahashii.*
(4) The 3rd antennal joint of the apterous form with 2 or 3 sensoria near the base.....*C. formosanus.*
— The 3rd antennal joint of the apterous form without sensoria. .....(5)
(5) Apterous form with a few short capitate hairs on the basal abdominal segments. .....*C. braggii.*
— Apterous form without capitate hairs on the basal abdominal segments. .....
.....*C. montanus.* n. sp.

Capitophorus formosanus Takah.

Trans. Nat. Hist. Soc. Formosa, XIX, p. 248 (1929).
Host.—Chrysanthemum sinensis.
Distr.—Taihoku. Japan.

Capitophorus hippophaes Koch.

Rhopalosiphum hippophaes, Koch, Die Pflanz., p. 28 (1857).

Capitophorus hippophaes, van der Goot, Beitr. Kennt. Holland. Blattl., p. 122 (1915); Contr. Fauna Ind. Neerl., I, 3, p. 45 (1917); Takahashi, Aphididae of Formosa, pt. 2, p. 28 p. 83 (1923); Theobald, Plant Lice Brit., I, p. 235 (1926); Nevsky, Monog. Aphid. Middle Asia, p. 134 (1929).

Hosts.—Polygonum lapathifolium, P. hydropiper.
Distr.—Taihoku, Urai. Japan, China, Java, Europe.

Capitophorus takahashii Strand.

Acta Univ. Latv., XX, p. 22 (1929).

Capitophorus sp., Takahashi, Aphididae of Formosa, pt. 4, p. 21 (1925).

Host.—Petasites tricholobus.

Distr.—Sankakuho.

Capitophorus formosartemisiae Takah.

Myzus formosartemisiae, Takahashi, Aphididae of Formosa, pt. 1, p. 25 (1921).

Capitophorus formosartemisiae, Takahashi, Aphididae of Formosa, pt. 2, p. 83 (1923).

Host.—Artemisia vulgaris var. indica.

Distr.—Taihoku.

Capitophorus braggii Gillette.

Myzus braggii, Gillette, Can. Ent., XL, p. 17 (1908); Jl. Econ. Ent., VIII, p. 377 (1915); Swain, Univ. Calif. Pub. Tech. Bull. Ent., III, p. 73 (1919).

Capitophorus braggii, van der Goot, Beitr. Kennt. Holland. Blattl., p. 119 (1915); Takahashi, Aphididae of Formosa, pt. 3, p. 33 (1924); Hall, Minist. Agr. Egypt, Tech. Sc. Serv. Bull. 68, p. 35 (1926); Hori, Hokkaido Agr. Expt. St. Rept. 23, p. 82 (1929).

Hosts.—Cirsium japonicum, Elaeagnus oldhami.

Distr.—Taihoku, Tansui. Japan, Egypt, Europe, North America.

C. cirsii Nevsky may be identical with this species.

Capitophorus montanus n. sp.

Capitophorus sp., Takahashi, Aphididae of Formosa, pt. 3, p. 34 (1924).

Host.—Cirsium japonicum.

Distr.—Kusukusu, Shussuiha near Daibu.

Description was given in the former paper. Closely allied to *C. braggii* Gillette, but differs in lacking capitate hairs on the basal part of abdomen.

Genus **Matsumuraja** Schumacher.

In *Neophorodon rubi* Takah., the type of *Neophorodon*, the apterous form has no long dorsal tubercles and the cornicles are swollen, while in *Matsumuraja*

rubi Mats., the type of *Matsumuraja* (syn. *Acanthaphis* Mats.), the apterous form has very long dorsal tubercles and the cornicles are not swollen.

Matsumuraja formosana Takah. and *M. rubicola* Takah. have the characters intermediate between *Neophorodon* and *Matsumuraja*, and I must regard *Neophorodon* as a synonym of *Matsumuraja*.

Key to species.

(1) Cornicles swollen; apterous form with no distinct dorsal tubercles, although each capitate hair arising from a very small tubercle.....*M. rubifoliae* n. n.

— Cornicles cylindrical or somewhat swollen; apterous form with eminent dorsal tubercles. .....(2)

(2) Apterous form with very long dorsal tubercles on the posterior part of abdomen and the cornicles scarcely swollen; alate form with a pair of small dorsal tubercles on the posterior part of abdomen and the cornicles somewhat swollen.....*M. rubicola.*

— Apterous form with short, blunt dorsal tubercles; cornicles scarcly swollen (winged form unknown). .....*M. formosana.*

Matsumuraja formosana Takah.

Aphididae of Formosa, pt. 4, p. 22 (1925).

Host.—Rubus sp.

Distr.—Tarowan.

Matsumuraja rubicola Takah.

Aphididae of Formosa, pt. 5, p. 4 (1927).

Hosts.—Rubus sp.

Distr.—Batoran.

Matsumuraja rubifoliae n. name.

Neophorodon rubi, Takahashi, Proc. Ent. Soc. Wash., XXIV, p. 204 (1922); Aphididae of Formosa, pt. 2, p. 17 (1923); pt. 3, p. 35, p. 105 (1924).

Host.—Rubus sp.

Distr.—Kagi, Riyohen, Shinten. Loochoo, Japan.

My name *rubi* was preoccupied by *rubi* Mats. and this new name is proposed.

Subfamily Agrioaphidinae.

Key to tribes.

(1) Eyes of the apterous form rudimentary.....Neophyllaphidini.
— Eyes well developed. .....(2)
(2) Cornicles represented as mere rings, eyes sometimes lacking ocular tubercles, body soft, with cottony secretion. .....Phyllaphidini.
— Cornicles usually developed, eyes always with ocular tubercles, body not soft, without cottony secretion. .....(3)
(3) Anal plate not bilobed; antennae with rather long eminent hairs which are not capitate. .....Chaitophorini.
— Anal plate often bilobed, antennae sometimes with capitate setae. .....(4)
(4) Frontal tubercles well developed especially on the mesal side, cornicles long. .....Drepanosiphini.
— Frontal tubercles usually absent, cornicles short, truncate. .....Agrioaphidini.

Tribe Neophyllaphidini.

Genus **Neophyllaphis** Takah.

Neophyllaphis podocarpi Takah.

Can. Ent., LII, p. 20 (1920); Aphididae of Formosa, pt. 1, p. 77 (1921); pt. 2, p. 129 (1923); pt. 3, p. 69, p. 112 (1924); Mordvilko, Compt. Rend. Acad. Sc. URSS, 1930, p. 279 (1930).

Mindarus podocarpi, Shinji, Dobuts. Zasshi, XXXIV, p. 532 (1922).

Hosts.—Podocarpus spp.

Distr.—Occurs throughout the whole range of Podocarpus in Formosa. Botel Tobago, Loochoo, Japan, China, Australia, New Zealand.

Tribe Phyllaphidini.

Key to genera.

(1) Anal plate deeply bilobed.....(2)
— Anal plate slightly indented.....*Phyllaphis*.
(2) Eyes with no ocular tubercles, distal part of the last antennal joint long, somewhat shorter than the base.....*Phyllaphoides*.
— Eyes with distinct ocular tubercles, distal part of the last antennal joint very short. .....*Shivaphis*.

Genus **Phyllaphoides** Takah.

Phyllaphoides bambusicola Takah.

Aphididae of Formosa, pt. 1, p. 75 (1921); pt. 2, p. 128 (1923).

Hosts.—Bambusa spp., Phyllostachys makinoi.

Distr.—Taihoku, Takeyama, Kanshirei, Riran, Shinten, Urai, Tarowan. China.

This aphid is very common, and Phyllostachys makinoi is the most favoured host, but it does not occur on Dendrocalamus. Boerner (1930) and I (1921) placed this aphid in the tribe Saltusaphidini, but the insect differs from that tribe in the head not produced on the front, lacking peculiar setae, and in the wings not narrowed, and now I place it here.

Genus **Shivaphis** Das.

Shivaphis celti Das.

Mem. Ind. Mus., VI, p. 246 (1918); Takahashi, Aphididae of Formosa, pt. 1, p. 74 (1921); pt. 2, p. 131 (1923); pt. 3, p. 66 (1924): Dobuts. Zasshi, XL, p. 161 (1928).

Chromaphis celticolens, Essig and Kuwana, Proc. Calif. Acad. Sc., 4th ser., VIII, p. 95 (1918).

Phyllaphis celticolens, Takahashi, Trans. Sapporo Nat. Hist. Soc., p. 195 (1919).

Shivaphis celticolens, Takahashi, Aphididae of Formosa, pt. 2, p. 130 (1923); pt. 3, p. 111 (1924).

Host.—Celtis sinensis.

Distr.—Throughout the whole range of the host. Loochoo, Japan, China, India, Ceylon.

Genus **Phyllaphis** Koch.

Phyllaphis machili Takah.

Trans. Nat. Hist. Soc. Formosa, XVIII, p. 146 (1928).

Host.—Machilus longipaniculata, M. sp.

Distr.—Kagi, Taihoku. Japan.

The ocular tubercles are scarcely present.

Phyllaphis sp.

Trans. Nat. Hist. Soc. Formosa, XIX, p. 529 (1929).

Host.—Fagus hayatae.

Distr.—Sansho-ambu in Kato-gun.

A few nymphs have been collected. This species may be *P. fagifoliae* Takah.

Tribe Chaitophorini.

Genus **Periphyllus** van der Hoeven.

Periphyllus formosanus Takah.

Aphididae of Formosa, pt. 1, p. 78 (1921); pt. 2, p. 134 (1923).

Host.—Acer sp.

Distr.—Sozan, Karapin, Batoran, Taihezan.

Tribe Drepanaphidini.

Genus **Drepanaphis** Del Guercio

Drepanaphis sauteri Takah.

Aphididae of Formosa, pt. 5, p. 8 (1927).

Host.—Acer sp.

Distr.—Batoran, Sekitei, Taihoku.

Tribe Agrioaphidini.

Key to genera.

(1) Frontal tubercles distinct, the 1st antennal joint protuberant on the distal part of the mesal side. .....*Tuberculoides.*

— Frontal tubercles absent, the 1st antennal joint not protuberant on the mesal side.....(2)

(2) Cornicles reduced, much shorter than wide. .....*Monellia.*

— Cornicles developed.....*Agrioaphis.*

Genus **Monellia** Oestl.

Monellia formosana Takah.

Myzocallis formosanus, Takahashi, Aphididae of Formosa, pt. 3, p. 64 (1924); Proc. Ent. Soc. Washington, XXVIII, p. 160 (1926).

Monellia formosana, Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 259 (1929).

Host.—Arundinaria sp.

Distr.—Arisan, Taihezan.

The wings are not placed horizontally in repose.

Genus **Tuberculoides** van der Goot.*

Key to species.

(1) Dorsal tubercles finger-like; head, thorax and antennae with long capitate hairs.....*T. querciformosanus.*

— Dorsal tubercles stout; hairs not capitate.....*T. pilosus.*

Tuberculoides querciformosanus Takah.

Myzocallis querciformosanus, Takahashi, Aphididae of Formosa, pt. 1, p. 72 (1921); Philippine Jl. Sc., XXIV, p. 713 (1924); Aphididae of Formosa, pt. 5, p. 19 (1927).

Hosts.—Quercus dentata, Q. variabilis.

Distr.—Taihoku, Taichu. Japan.

Tuberculoides pilosus Takah.

Myzocallis pilosus, Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 256 (1929).

Host.—Quercus sp.

Distr.—Taihoku.

Genus **Agrioaphis** Walker.

Key to species.

(Winged viviparous female)

(1) Body purplish black, with very large lateral tubercles which are much larger than the cornicles. .....*A. bambusicola.*

— Body white, yellow or green, with no very large lateral tubercles.....(2)

(2) Sensoria on the 3rd antennal joint transversely narrowed. .....(3)

**Recticallis* Mats. is a synonym of this genus.

— Sensoria on the 3rd antennal joint oval or circular. .....(6)

(3) Abdomen with prominent tubercles.....(4)

— Abdomen without prominent tubercles. .....(5)

(4) Body yellow, with dusky markings, cornicles nearly as long as wide, the 3rd antennal joint with about 9 sensoria.....*A. kahawaluokalani.*

— Body green, cornicles longer than wide, the 3rd antennal joint with over about 20 sensoria.....*A. viridis.*

(5) The 3rd antennal joint longer than the 4th and 5th taken together, with about 40 sensoria almost over the whole length.....*A. mushensis.*

— The 3rd antennal joint shorter than the 4th and 5th taken together, with about 8 sensoria on the basal half. .....*A. insularis.*

(6) Abdomen with finger-like tubercles. .....*A. pseudoalni.*

— Abdomen without finger-like tubercles. .....(7)

(7) Abdomen with dorsal markings. .....*A. bambusifoliae.*

— Abdomen without markings. .....*A. taiwanus.*

The sensoria on the 3rd antennal joint are linear in some species of this genus, and Matsumura and Nevsky have proposed *Tinocallis* and *Tuberocallis* respectively for such species. However, in some species they are transversely oval, and in others they are transversely narrowed, showing various degrees of transverse narrowing, and I treat all these species in one genus.

Agrioaphis pseudoalni Takah.

Myzocallis pseudoalni, Takahashi, Aphididae of Formosa, pt. 1, p. 71 (1921); pt. 2, p. 121 (1923); pt. 3, p. 58 (1924); Granovsky, Ann. Ent. Soc. Amer., XXI, p. 559 (1928).

Host.—Alnus formosana.

Distr.—Taihoku, Suo.

Agrioaphis mushensis Takah.

Myzocallis mushensis, Takahashi, Aphididae of Formosa, pt. 4, p. 45 (1925).

Host.—Zelkowa formosana.

Distr.—Musha, Baikei, Rengechi.

Agrioaphis insularis Takah.

Myzocallis insularis, Takahashi, Aphididae of Formosa, pt. 5, p. (1927).

Host.—Sapindus mukorossi

Distr.—Taihoku.

Agrioaphis kahawaluokalani Kirk.

Myzocallis kahawaluokalani, Kirkaldy, Proc. Ent. Soc. Hawaii, I, p. 101 (1907); Fullaway, Ann. Rept. Hawaii. Agr. Expt. St., 1909, p. 43 (1910), Timberlake, Proc. Ent. Soc. Hawaii, V, p. 451 (1924).

Callipterus kahawaluokalani, Takahashi, Aphididae of Formosa, pt. 1, p. 74 (1921); pt. 2, p. 44, p. 125 (1923); pt. 3, p. 65 (1924).

Monellia lagerstroemiae, Takahashi, Dobuts. Zasshi, XXXII, p. 118 (1920).

Hosts.—Lagerstroemia spp.

Distr.—Throughout the range of Lagerstroemia in Formosa. Japan, Hawaii, North America.

Agrioaphis viridis Takah.

Myzocallis viridis, Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 252 (1929).

Host.—Zelkowa formosana.

Distr.—Taihoku, Musha.

Agrioaphis bambusifoliae Takah.

Myzocallis bambusifoliae, Takahashi, Aphididae of Formosa, pt. 1, p. 73 (1921); pt. 2, p. 123 (1923); pt. 3, p. 63 (1924); Proc. Ent. Soc. Washington, XXVIII, p. 159 (1926).

Hosts.—Bambusa spp.

Distr.—Taihoku, Hatsune, Kanshirei. Loochoo, Japan.

Agrioaphis taiwanus Takah.

Myzocallis sasae, Takahashi (nec. Mats.), Aphididae of Formosa, pt. 4, p. 46 (1925).

M. taiwanus, Takahashi, Proc. Ent. Soc. Washington, XXVIII, p. 160 (1926).

Host.—Bambusa sp.

Distr.—Taihoku, Shinten, Kokotsu, Batoran, Riran, Karenko.

Agrioaphis bambusicola Takah.

Myzocallis bambusicola, Takahashi, Aphididae of Formosa, pt. 1, p. 70 (1921); pt. 2, p. 119 (1923); Proc. Ent. Soc. Washington, XXVIII, p. 162 (1926).

Hosts.—Bambusa sp., Dendrocalamus latiflorus.

Distr.—Taihoku, Hokuto, Suisha.

Subfamily Thelaxinae.

This subfamily is divided into the tribes Hormaphidini and Thelaxini, but the latter tribe is not represented in Formosa.

Tribe Hormaphidini.

Key to subtribes.

(1) Head with a pair of horns on the front.....Cerataphidina.
— Head without horns on the front.....Hormaphidina.

Subtribe Hormaphidina.

Key to genera.

(1) Cauda constricted at the base; nymphs and apterous females without stout setae on the front. .....(2)
— Cauda not constricted at the base; nymphs and apterous females with short stout setae on the front.....*Astegopteryx*.
(2) Aleyrodiform females with reduced antennae, legs, and abdomen. ..... *Thoracaphis*.
— Aleyrodiform females with developed antennae, legs, and abdomen. ..... *Aleurodaphis*.

Genus **Astegopteryx** Karsch.

The members of this genus are found only in the oriental countries and produce galls on Styrax or Distylium. Van Leeuwen has described many galls of these aphids on Styrax from Java, but the species have not been identified. The life history of this genus has not been worked out, and no sexual forms and no aleyrodiform females are now known. *Nipponaphis* Pergande and *Schizoneuraphis* van der Goot are synonymous with this genus.

It is very remarkable that in some species of the genus the apterous forms and nymphs often leave the galls on Styrax and crawl over them and on the branches, dropping to the ground when disturbed, and pierce the skin, causing eruptions, if they come in contact with the face or hands. This has been observed by me in *Astegopteryx styracicola* Takah. and *A. jamuritsu* n. sp., and the similar habit has also been recorded by van Leeuwen in Java. The habit of stinging man is not known in other genera of aphids, although a few predaceous cases have been observed in some species (Takahashi, Aphid. Formosa, pt. 4, p. 5; Myers, 1929). The apterous females and nymphs of *Astegopteryx styracophila* Karsch are always found within the galls, not crawling out, but when they are taken out of the galls and placed on the hands, they sting the skin like *A. styracicola* Takah. and *A. jamuritsu* n. sp.; and the habit of stinging man observed in *Astegopteryx* must be considered to be accidental and of no ecological significance.

Key to species.

(Winged viviparous female)

(1) The 3rd antennal joint with 0–10 sensoria, the 4th and 5th joints without secondary sensoria. ..... *A. jamuritsu* n. sp.

— The 3rd antennal joint with more sensoria, the 4th and 5th with secondary sensoria. ..... (2)

(2) The 3rd antennal joint much longer than the 4th and 5th taken together. ..... *A. styracicola.*

— The 3rd antennal joint as long as the 4th and 5th taken together. ..... *A. styracophila.*

Astegopteryx styracophila Karsch.

Ber. deutsch. Bot. Gesell., VIII, p. 52 (1890); Takahashi, Aphididae of Formosa, pt. 2. p. 54 (1923); pt. 3, p. 93 (1924).

Astegopteryx nekoashi, Sasaki, Ier Congr. Intern. Ent., Bruxelles, 1910, Mem., II, p. 449 (1911); Matsumura, Coll. Essays for Nawa, Gifu, p. 50 (1917); Takahashi, Aphididae of Formosa, pt. 2, p. 146 (1923); Okamoto and Takahashi, Ins. Mats., I, p. 145 (1927); Monzen, Saito Ho-on Kai Monog., I, p. 15 (1929); Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 530 (1929).

Hosts.—Styrax suberifolium, S. sp.

Distr.—Taihoku, Sozan, Dandan, Riyohen, Suisha, Tosei. Japan, Corea, Java.

The sensoria on the 3rd antennal joint of the winged form vary in number from 19–30 and *A. nekoashi* Sasaki is only a form of *A. styracophila* Karsch. The galls produced by this aphid on Styrax japonicus in Japan are shorter and broader than those in Jave described by Tarsch, but the galls on Styrax suberifolium in Formosa are slender like those in Java, while those on Styrax sp. in Formosa are short and broad like those in Japan. These facts indicate that the shape of the galls can not be relied upon for distinguishing species.

Near Taihoku the galls containing the aphids are found from July to January.

Astegopteryx styracicola Takah.

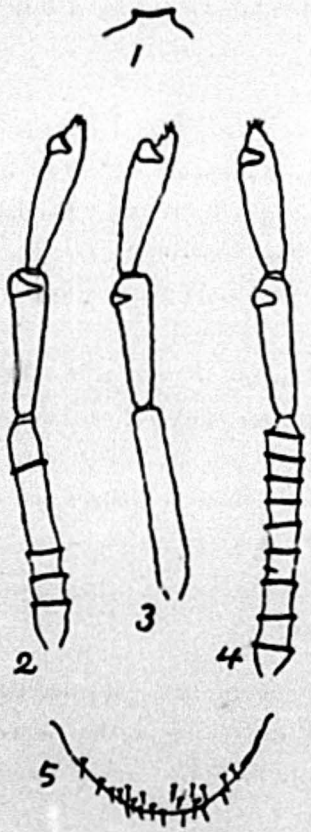
Aphididae of Formosa, pt. 1, p 94 (1921); pt. 2, p. 53, p. 146 (1923); pt. 3, p. 92 (1924).

Hosts.—Styrax suberifolium, S. formosanum.

Distr.—Taihoku, Suisha, Kannonzan, Shinten, Sozan, Tosei.

Astegopteryx jamuritsu n. sp.

(Winged viviparous female) Head, antennae and thorax black. Abdomen blackish green. Wing veins and stigma gray. Head with some minute setae. Front ocellus on a distinctly protruding cone. Eyes large, with small ocular tubercles. Antennae rather slender, with a few short setae, 5-jointed; the 1st joint a little larger than the 2nd; the 3rd narrower than the 2nd, with 4–10 sensoria which are almost entirely encircling the circumference of joint and are sometimes entirely wanting; the 4th narrowing towards the base, without secondary sensoria, the primary sensorium large, transversely narrowed, more or less pointed on the lateral end, somewhat protruding; the 5th narrowed towards the base, lacking secondary sensoria, with a similar primary sensorium and a few longer apical setae; the relative length of joints about as follows; III–37, IV–22, V–22. Rostrum not reaching the middle coxae. Mesonotum not divided into lobes, with a large oval wax-plate on the hind part and some minute setae. Abdomen with some setae. Cornicles very short, much shorter than wide, expanded on the base. Anal plate short, distinctly divided, each lobe rounded, with many long bristles. Cauda large, larger than the lobe of anal plate, rounded, not constricted, with many setae. Legs slender, with many rather long setae; front tibiae almost as stout as the 3rd antennal joint, somewhat shorter than the antenna; hind tarsi not imbricated, slightly longer than the 4th antennal joint, with 2 long fine capitate hairs. Front wings with about 5 minute pores in a loose cluster on the base of subcosta



Antegypteryx jamuritsu n. sp.
(Winged viviparous female)
Fig. 1.....Cornicle.
Figs. 2–4.....Antenna.
Fig. 5.....Cauda.

and about 7 very small circular pores in a row on the subcosta; the 1st and 2nd obliques somewhat stouter than other veins, entirely united on the basal part; the 2nd somewhat curved; the 3rd obsolete on the basal part, once branched, the branch nearly extending to the tip of wing; stigmatic vein moderately curved; stigma normal; hind wings with 2 obliques nearly parallel, the 2nd somewhat curved; hooklets 2.

Length of body—about 1.5 mm. Antenna—about 0.45 mm. Fore wing—about 2.5 mm. Hind tibia—about 0.55 mm. Diameter of apex of cornicle—about 0.04 mm.

(Wingless viviparous female) Dark brown in specimens preserved in alcohol. Body oval, broadest about midlength of abdomen, wanting wax-plates and eminent hairs. Head a little protruding at the middle of front, with a pair of very small horn-like setae at the middle of front which are much shorter than the 1st antennal joint, pointed, and somewhat curved upward. Eyes small, of 6 or more facets in a loose group. Antennae 5-jointed, with a few setae; the 4th joint narrowed towards the base, with a very small oval sensorium; the 5th somewhat narrowed towards the base, with many spinules in transverse rows and a few short apical setae; the relative length of joints about as follows: I—11, II—11, III—19, IV—15, V—19. Rostrum reaching the middle coxae. Cornicles represented nearly as mere rings. Cauda rounded, not constricted at the base, with many long bristles. Anal plate very short, divided, each lobe rounded, with some long bristles. Legs rather slender, with many rather long fine bristles; hind tibiae slightly longer than the antenna; hind tarsi almost as long as the 3rd antennal joint, with 2 very long fine slightly capitate hairs; claws long.

Length of body—about 2.0 mm. Antenna—about 0.36 mm. Frontal seta—about 0.0185 mm. Hind tibia—about 0.41 mm. Diameter of apex of cornicle—about 0.042 mm.

(Gall) Cylindrical, straight, moderately expanded towards the distal end, truncate at the tip, hard, grayish brown, covered with white powder, with a very

large longitudinal cell opening on the distal side; about 120–145 mm. in length, about 30–85 mm. in diameter at the distal end.

Host.—Styrax suberifolium.

Distr.—Shussuiha (altitude about 1000 m.) near Daibu, Batoran near Karenko.

Many specimens were collected by me in a gall on November 18, 1930 at Shussuiha. This species is characterized by possessing 4–10 sensoria only on the 3rd antennal joint of the winged female, which are sometimes entirely absent. The natives of the tribe "Paiwan" in the southern part of Formosa call the galls of this aphis "Jamuritsu", from which the specific name has been derived.

The galls variable in size are suspended on the branches of the host, and several galls may be found on a single host tree. Numerous aphids are found in a gall, and some of them crawl about on the out side of the gall and drop to the ground when disturbed. As mentioned already, when they come in contact with the face or hands, they pierce the skin with rostrum, causing eruptions.

Genus **Thoracaphis** van der Goot.

This genus has been considered a synonym of *Astegopteryx* Karsch by Mordvilko and the writer, but is distinguishable from that genus in the cauda distinctly constricted at the base in the winged and aleyrodiform females, and now it is treated as a distinct genus.

The members of the genus may be arranged in the following categories:

(1) Species which produces galls on Distylium and migrates to Quercus to spend summer on it. *T. distyliifoliae* Takah. (*Nipponaphis distyliifoliae* Takah., *Astegopteryx distyliifoliae* Takah.) is the only example of this category.

(2) Species which spend all the year on a host, not producing galls and not migrating to other plants. *T. cuspidatae* Essig et Kuw. on Quercus, Tetradenia and Cinnamomum, *T. quercicola* Takah. on Quercus, *T. fici* Takah. on Ficus, and *T. formosanus* Takah. on Machilus are included in the category. All the apterous forms of these species are aleyrodiform and no sexual forms occur throughout the year. This type of life, no doubt, has been derived from the above migrating type (1), and the hosts must be considered to be secondary.

Some species of the genus are associated with ants. In Formosa, *T. takahashii* Strand and *T. formosanus* Takah. are often protected by *Crematogaster*, while other species are not in association with it, and in Japan *T. cuspidatae* Essig et Kuw. is sometimes protected with shelters by *Lasius*.

Astegopteryx kashifoliae Uye must be removed to this genus.

Key to species.

(Aleyrodiform female)

(1) Body densely provided with setae which are expanded basally..... .....*T. formosanus.*

— Body without such setae. .....(2)

(2) Body shrinked on the dorsal surface, with spine-like setae on the margin. ... .*T. lithocarpi.*

— Body without such marginal setae.....(3)

(3) Dorsum distinctly reticulated.....(4)

— Dorsum granular or mosaic-like.....(5)

(4) Body with long bristles on the margin. .....*T. fici.*

— Body with no marginal bristles. .....*T. quercicola.*

(5) Body with long bristles on the margin. .....*T. takahashii.*

— Body without bristles on the margin. .....*T. cuspidatae.*

(Winged viviparous female)

(1) The 3rd antennal joint much longer than the 4th and 5th taken together. ... .*T. fici.*

— The 3rd antennal joint nearly as long as the 4th and 5th taken together...(2)

(2) Fore wings distinctly infuscated on the basal part. .....(3)

— Fore wings not infuscated on the basal part, but narrowly so along the 1st and 2nd obliques.....*T. quercicola.*

(3) Cornicles very small, much smaller in diameter than the width of anal lobe. .....*T. cuspidatae.*

— Cornicles not so small, nearly as wide as the anal lobe. .....*T. formosanus.*

The winged forms of *T. lithocarpi* Takah. and *T. takahashii* Strand are not known.

Thoracaphis takahashii Strand.

Acta Univ. Latv., XX, p. 22 (1929).

Astegopteryx sp., Takahashi, Aphididae of Formosa, pt. 4, p. 51 (1925).

Hosts.—Quercus glauca, Lithocarpus sp.

Distr.—Baikei, Shirin, Riyohen. Japan (Kurashiki).

This species is usually protected by *Crematogaster* in Formosa.

Thoracaphis lithocarpi Takah.

Astegopteryx lithocarpi, Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 531 (1929).

Host.—Lithocarpus sp.

Distr.—Hori, Kinyan.

Thoracaphis formosanus Takah.

Astegopteryx formosana, Takahashi, Trans. Nat. Hist. Soc. Formosa, XVII, p. 388 (1927); Ibid., XIX, p. 101 (1929).

Host.—Machilus sp.

Distr.—Taihoku, Hokuto, Maruyama, Kannonzan, Kagi.

Very closely allied to *T. cuspidatae* Essig et Kuw. Contrary to my earlier belief, this species is not an *Astegopteryx*.

Thoracaphis cuspidatae Essig et Kuw.

Nipponaphis cuspidatae, Essig and Kuwana, Proc. Calif. Acad. Sc., 4th ser., VIII, p. 110 (1918); Takahashi, Bull. Brooklyn Ent. Soc., XV, p. 115 (1920).

Astegopteryx cuspidatae, Takahashi, Aphididae of Formosa, pt. 2, p. 149 (1923); pt. 4, p. 51 (1925); Boll. Lab. Zool. Portici, XX, p. 148 (1927).

Astegopteryx gigantea, Takahashi, Aphididae of Formosa, pt. 1, p. 92 (1921); pt. 2, p. 150 (1923).

Host.—Quercus stenophylloides.

Distr.—Sakuragamine, Taihoku. China, Japan.

A winged form was found in Taihoku resting on Ficus, which was described by me as *Astegopteryx gigantea*, but now I have no hesitation in reducing it to *T. cuspidatae*. The antenna of the winged form figured by Essig and Kuwana is not normal in the length of the 3rd joint. This species is found on Quercus, Cinnamomum and Tetradenia in Japan, but in Formosa it has been discovered only on Quercus.

This aphis attacks usually the shoots and branches, but sometimes some apterous forms are seen on the lower sides of the leaves near Tokyo. Those on the leaves are small in size, secrete much wax, and die, without producing young.

Such a fact is also observed in *Doraphis populi* Hori et Mats., the nymphs of the winged form of which group on the lower surface of the leaves of Populus, while the apterous forms usually attack the branches. But the nymphs of the apterous form sometimes locate themselves on the lower sides of the leaves and die, without maturing.

Thoracaphis quercicola Takah.

Astegopteryx quercicola, Takahashi, Aphididae of Formosa, pt. 1, p. 93 (1921): pt. 2, p. 147 (1923); pt. 3, p. 94 (1924).

Hormaphis quercicola, Mordvilko, Compt. Rend. Acad. Sc. URSS, 1930, p. 171 (1930).

Host.—Quercus variabilis, attacking the lower side of the leaf.

Distr.—Taihoku.

This species is closely related to *T. distyliifoliae* Takah., but is different in possessing about 22-24 sensoria on the 3rd antennal joint of the winged form. In *T. distyliifoliae* about 13-15 sensoria are present on that segment.

The winged form closely resembles that of *Astegopteryx styracophila* Karsch, but differs distinctly in the cauda constricted at the base.

In Taihoku the aleyrodiform females are found on the leaves of Quercus through the year, the winged forms appearing from November to March, and no sexual forms occur. Mordvilko referred this species to *Hormaphis*, but it differs from that genus in the number of the antennal joints, as well as in the wing veins.

Thoracaphis fici Takah.

Astegopteryx fici, Takahashi, Aphididae of Formosa, pt. 2, p. 55, p. 146 (1923); pt. 3, p. 96 (1924); Boll. Lab. Zool. Portici, XX, p. 148 (1927).

Hosts.—Ficus retusa, F. wightiana, F. elustica.

Distr.—Through the whole range of Ficus in Formosa. Loochoo, Botel Tobago, China.

In the winged form, the head with 6 rather long stout setae in a row near the hind margin and 4 pairs of similar ones on the anterior part, and the abdomen with a few long stout setae on the margin and the posterior part.

Genus **Aleurodaphis** van der Goot.

This genus was treated as a synonym of *Astegopteryx* by Mordvilko and was

considered as a possible synonym of it by Boerner, but in my opinion it is a distinct genus, differing in the following characters: (1) Apterous form with many well-developed wax-pores on the dorsum and margin. (2) Antennae and legs well developed in the apterous form. (3) In the apterous form, meso-and metathoraci fused together, but defined from the prothorax and abdomen. (4) Apterous form elongate, with larger abdomon. Only the winged and aleyrodiform females are now known.

Key to species.

(Aleyrodiform female)

(1) Rostrum reaching beyond the middle coxae; the 3rd antennal joint as long as or shorter than the 5th in the 5-jointed antennae.....*A. blumeae.*

— Rostrum reaching the middle coxae; the 3rd antennal joint longer than the 5th. .....*A. mikaniae.*

Aleurodaphis blumeae van der Goot.

Contr. Fauna Indes Neerl., I, 3, p. 240 (1917); Takahashi, Aphididae of Formosa, pt. 1, 92 (1921); pt. 2, p. 150 (1923); pt. 3. p. 98 (1924).

Astegopteryx japonica, Takahashi, Aphididae of Formosa, pt. 2, p. 67 (1923).

Host.—Blumea chinensis.

Distr.—Taihoku, Kusukusu, Urai. Japan, Java.

Aleurodaphis mikaniae Takah.

Aphididae of Formosa, pt. 4, p. 51 (1925).

Host.—Mikania skandens.

Distr.—Tarowan.

This species differs from the preceding one also in the longer legs of the apterous form, the hind legs reaching beyond the posterior end of abdomen. In *A. blumeae* van der Goot the hind legs do not reach beyond it.

Subtribe Cerataphidina.

The species of this group do not migrate and no sexual forms have been found.

Key to genera.

(1) Cauda not constricted at the base, anal plate not bilobed.....*Ceratoglyphina.*

— Cauda constricted at the base, anal plate bilobed. .....(2)

(2) Apterous form with 2 divisions on the body, and wax-pores in a single row along the whole margin of body.....*Cerataphis.*

— Apterous form with more or less defined abdominal segments, wax-pores not arranged along the whole margin of body .....(3)

(3) Cornicles on hairy cones, apterous form with wax-pores in a single row on the side of each abdominal segment, lacking chitinized parts on the dorsum. .....*Trichoregma.*

— Cornicles not on hairy cones; apterous form with well-developed wax-pores, when they are present, in a group on the side of each abdominal segment and at the middle of the 8th abdominal segment, with or without chitinized parts on the dorsum.....(4)

(4) Apterous form with chitinized parts on the dorsum and many small not-well-developed wax-pores, not densely covered with secretion.*.....*Oregma.*

— Apterous form without chitinized parts on the dorsum, with only well-developed wax-pores, densely covered with secretion.....*Ceratovacuna.*

Genus **Ceratovacuna** Zehntner.

This genus was regarded as a synonym of *Oregma* Buckt. by van der Goot, Baker and Boerner, but differs from it as mentioned in the key. The winged form is not distinguishable from that of *Oregma.*

Key to species.

(Wingless viviparous female)

(1) Body with many very long wax-filaments much longer than the body and about 14–18 wax-pores in a very large group on the side of each abdominal segment. .....*C. longifila.*

— Body without so long wax filaments, with 1–12 wax-pores in a group on the side of each abdominal segment.....(2)

(2) Yellow or dark green, horns distinctly diverging, head without 4 hairs arranged in a transverse row between the eyes. .....*C. lanigera.*

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*Well-developed wax-pores also present in many species.

— Blackish purple or reddish brown, horns almost parallel or somewhat diverging, head with 4 hairs arranged in a transverse row between the eyes. ....*C. orientalis.*

Ceratovacuna lanigera Zehnt.

Arch. Java Suikerindustrie, p. 553 (1897); Matsumura, Die schaedl. u. nutz. Zuck. Ins. Formosa, p. 12 (1910).

Oregma lanigera, van der Goot, Contr. Fauna Indes Neerl., I, 3, p. 190 (1917); Takahashi, Aphididae of Formosa, pt. 1, p. 87 (1921); pt. 2, p. 145 (1923); pt. 3, p. 78 (1924).

Cerataphis saccharivora Matsumura, Coll. Essays for Nawa, Gifu, p. 57 (1917).

Hosts.—Miscanthus sp., Saccharum officinarum.

Distr.—Over the lowlands of Formosa. Botel Tobago, Hokoto, Loochoo, Japan, Philippine, Java, Ceylon, etc.

Ceratovacuna longifila Takah.

Oregma longifila, Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 102 (1929).

Host.—Bambusa sp.

Distr.—Suisha.

Ceratovacuna orientallis Takah.

Oregma orientalis, Takahashi, Aphididae of Formosa, pt. 2, p. 52, p. 144 (1923).

Oregma oplismeni, Takahashi, Aphididae of Formosa, pt. 3, p. 89 (1924).

Hosts.—Arthraxon ciliaris, Oplismenus compositus.

Distr.—Over the lowlands of Formosa.

The horns of *oplismeni* are longer, but it may be a synonym.

Genus **Oregma** Buckt.

Key to speaies.

(Wingless viviparous female)

(1) Horns on the front rounded apically. .....(2)

— Horns pointed. .....(4)

(2) Body with large, well-developed wax-pores in groups on the dorsum. .... *O. panicola.*

— Body with many small, circular or oval, not-well-developed wax-pores over the dorsum. .....(3)

(3) Almost black, with a purplish tinge, horns slightly narrowed on the base.... .....*O. tattakana.*

— Pale yellowish brown, horns not narrowed on the base..... .....*O. tattakana,* var. *suishana.*

(4) Body without large, well-developed wax-pores. .....*O. bambusicola.*

— Body with large, well-developed wax-pores.....(5)

(5) Body with large, well-developed wax-pores on only the 6th, 7th and 8th abdominal segments, front femora of the 1st instar much stouter than other femora. .....*O. alexanderi.*

— Body with large well-developed wax-pores on the thorax and all the abdominal segments; front femora of the 1st instar not enlarged.....(6)

(6) Horns as long as the 1st antennal joint.....*O. pseudomontana.*

— Horns longer than the 1st antennal joint.....*O. koshunensis.*

Oregma tattakana Takah.

Aphididae of Formosa, pt. 4, p. 47 (1925).

Host.—Arundinaria niitakayamensis.

Distr.—Tattaka.

var. **suishana** Takah.

Trans. Nat. Hist. Soc. Formosa, XIX, p. 530 (1929).

Host.—Bambusa sp.

Distr.—Suisha.

Oregma koshunensis Takah.

Aphididae of Formosa, pt. 3, p. 84 (1924).

Host.—Bambusa sp.

Distr.—Kusukusu, Riran.

Oregma pseudomontana Takah.

Aphididae of Formosa, pt. 3, p. 82 (1924).

Oregma montana, Takahashi (nec. van der Goot), Aphididae of Formosa, pt. 2, p. 52, p. 144 (1923); pt. 4, p. 48 (1925).

O. heitoensis, Takahashi, Aphididae of Formosa, pt. 5, p. 13 (1927).

Hosts.—Bambusa spp., Arundinaria sp.

Distr.—Over the lowlands of Formosa.

Oregma panicola Takah.

Aphididae of Formosa, pt. 1, p. 90 (1921); pt. 2, p. 49, p. 144 (1923); pt. 3, p. 79 (1924).

Hosts.—Panicum patens, P. sp.

Distr.—Taihoku, Urai, Kankau, Suisha, Tosei, Musha, Domon, Batoran.

Differs from *O. panici* van der Goot in the rounded horns, as well as in the distribution of wax-pores on the dorsum.

Oregma bambusicola Takah.

Aphididae of Formosa, pt. 1, p. 89 (1921); pt. 2, p. 50, p. 142 (1923); pt. 3, p. 79 (1924).

Hosts.—Bambusa spp., especially attacking the young shoots of B. stenostachya.

Distr.—Taihoku, Sozan, Shinten, Tainan, Shokwa, Kagi. Japan, China.

Closely allied to *O. bambusae* Buckt., differing, however, in the colour, lacking well-developed wax-pores, and the longer horns which are as long as the 1st antennal joint in the apterous form, as well as in the 3rd antennal joint of the alate form, which is nearly as long as or a little longer than the 4th and 5th taken togther.

Oregma alexanderi Takah.

Aphididae of Formosa, pt. 3, p. 81 (1924); Trans. Nat. Hist. Soc. Formosa, XIX, p. 101 (1929).

Hosts.—Dendrocalamus latiflorus, Miscanthus sp.

Distr.—Funkiko, Takeyama, Karapin.

Genus **Trichoregma** Takah.

Key to species.

(Wingless viviparous female)

(1) Horns on the front pointed. .....*T. rhapidis.*

— Horns rounded.....(2)

(2) Dorsum with a large dark green patch; wax-pores in each row in contact with each other.....*T. insularis.*

— Dorsum with 2 pairs of dark green patches; wax-pores in each row usually separated from each other.....*T. bambusifoliae.*

Trichoregma bambusifoliae Takah.

Oregma bambusifoliae, Takahashi, Aphididae of Formosa, pt. 1, p. 87 (1921); pt. 2, p. 143 (1923); pt. 3, p. 85 (1924).

Trichoregma bambusifoliae, Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 252 (1929).

Hosts.—Dendrocalamus latiflorus, Bambusa spp.

Distr.—Over the lowlands of Formosa. Loochoo, Japan.

This species is very closely allied to *T. minuta* van der Goot and may be its synonym, but the Formosan specimens differ from the description of van der Goot in that the wax-pores on the apterous form are more developed, the rows each consisting of about 4–6 pores.

Trichoregma insularis van der Goot.

Cerataphis insularis, van der Goot, Tijdschr. v. Ent., LV, p. 325 (1912).

Oregma insularis, van der Goot, Contr. Fauna Indes Neerl., I, 3, p. 186 (1917).

Oregma formosana, Takahashi, Aphididae of Formosa, pt. 3, p. 88 (1924).

Host.—Dendrocalamus latiflorus.

Eistr.—Funkiko (Arisan), Suisha. Java, Ceylon, India.

The antennae of the apterous form are 4 or 5-jointed. *Oregma mysorensis* Theob. (syn. *O. mysorensis* Krishn.) may be synonymous with this species.

Trichoregma rhapidis van der Goot.

Oregma rhapidis, van der Goot, Contr. Fauna Indes Neerl., I, 3, p. 217 (1917).

Host.—A plant of the Palmae.

Distr.—Heito. Java, Sumatra, Singapore.

Many apterous and alate females were observed in very loose clusters on the lower sides of the young leaves on November 16, 1930. The Formosan specimens are smaller and dark brown in colour and the horns of the alate forms are more or less pointed at the tip; and the apterous forms have a pair of bristles between the rows of wax-pores on the 8th abdominal segments. The cornicles of the apterous forms are on elevated cones which are furnished with some bristles, and I have removed the species to *Trichoregma*. New to the fauna of Formosa.

Genus **Cerataphis** Licht.

Key to species.

(Wingless viviparous female)

(1) Horns on the front united nearly on the basal half, small, not reaching beyond the front margin of head, antennae usually 5-jointed, marginal wax-pores much narrowed. .....*C. bambusifoliae.*

— Horns not united on the basal half, reaching beyond the front margin, antennae usually 4-jointed, wax-pores not so much narrowed. .....(2)

(2) Horns finger-like, rounded apically.....*C. formosanus.*

— Horns pointed apically. .....*C. lataniae.*

Cerataphis lataniae Boisd.

Coccus? lataniae, Boisduval, Essai Ent. Hort., p. 355 (1867).

Boisduvalia lataniae, Signoret, Ann. Soc. Ent. Fr., 1868, p. 400 (1868).

Cerataphis lataniae, Buckton, Mon. Brit. Aphid., IV, p. 198 (1883); Embleton, Jl. Linn. Soc. Zool., XXIX, p. 90 (1903); van der Goot, Beitr. Kennt. Holland. Blattl., p. 435 (1915); Maki, Forest Expt. St. Formosa, Spec. Rept., 1, p. 36 (1915); van der Goot, Contr. Fauna Indes Neerl., I, 3, p. 169 (1917); Matsumura, Essays for Nawa, Gifu, p. 58 (1917); Takahashi, Aphididae of Formosa, pt. 1, p. 91 (1921); pt. 2, pl. IV, B, fig. 1 (1923); pt. 3, p. 91 (1924); Theobald, Plant Lice Brit., III, p. 309 (1929).

Hosts.—Areca catechu, A. oleracea, Pothos seemanni, Cocos nucifera.

Distr.—Over the whole lowlands in Formosa. Botel Tobago. Widely distributed over the tropical and subtropical countries in the world.

Cerataphis formosanus Takah.

Aphididae of Formosa, pt. 3, p. 90 (1924).

Host.—Cocos sp.

Distr.—Kurarn.

Cerataphis bambusifoliae Takah.

Aphididae of Formosa, pt. 4, p. 50 (1925); Lingnan Sc. Jl., IX, p. 11 (1930).

Host.—Bambusa sp.

Distr.—Hori, Taihezan. China.

Genus **Ceratoglyphina** van der Goot.

(Winged form) Head with a pair of short horns on the front. Eyes with small ocular tubercles. Antennae much shorter than the body, 5-jointed, with linear sensoria. Mesonotum not divided into lobes. Media once branched, hind wings with 2 obliques. Cornicles short, as in the apterous form. Cauda broadly rounded, not constricted. Anal plate not bilobed.

Ceratoglyphina bambusae van der Goot.

Contr. Fauna Indes Neerl., I, 3, p. 237 (1917); Takahashi, Aphididae of Formosa, pt. 4, p. 49 (1925).

Host.—Bambusa sp.

Distr.—Taihoku, Suisha. Java.

The winged form was not mentioned in the original description.

Subfamily Eriosomatinae.

Key to tribes.

(1) Cornicles present at least in the apterous or alate form. .....Eriosomatini.
— Cornicles entirely absent.....Fordini.

Tribe Eriosomatini.

Key to genera.

(1) Media once branched. .....*Eriosoma.*
— Media not branched. .....*Tetraneura.*

Genus **Tetraneura** Hartig.

In Formosa a few species of Ulmus grow wildly, but the aphids of this genus have not been found on them, always inhabiting the roots of the secondary hosts, the Gramineae.

Key to species.

(1) In the apterous form, body with very long stout setae along the side, antennae 3-6-jointed, and legs not swollen on the tibia, with rather long setae.... .....*T. hirsuta.*

— In the apterous form, body without very long setae, antennae 5 or 6-jointed, legs large, with many short setae, and hind tibiae slightly swollen near the tip. .....*T. radicicola.*

Tetraneura radicicola Strand.

Tetraneura sp., Takahashi, Aphididae of Formosa, pt. 4, p. 54 (1925); pt. 5, p. 14 (1927).

T. radicicola, Strand, Acta Univ. Latv. XX, p. 22 (1929); Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 529 (1929).

T. takahashii, Mordvilko, Compt. Rend. Acad. Sc., URSS., 1930, p. 279 (1930).

Hosts.—Miscanthus sp., Saccharum officinarum.

Distr.—Karenko, Tosei, Kori. China.

The winged form is not known.

Tetraneura hirsuta Baker.

Dryopeia hirsuta, Baker, Dept. Agr. Calif. Mth. Bull., X, p. 159 (1921); Takahashi, Aphididae of Formosa, pt. 1, p. 97 (1921); pt. 2, p. 152 (1923); Tan, Philippine Agric., XIII, p. 277 (1924).

Tetraneura hirsuta, Theobald, Entom., LXI, p. 2 (1928).

Tetraneura javensis, Takahashi (nec. van der Goot), Aphididae of Formosa, pt. 1, p. 97 (1921); pt. 2, p. 151 (1923).

Tetraneura ulmi, Takahashi (nec. Linn.), Deli Expt. St. Medan, Rept., No. 24, p. 5 (1925).

Hosts.—Alopecurus aequalis, Eleusine indica, Miscanthus sp., Oryza sativa, Saccharum officinarum.

Distr.—Taihoku, Riyohen, Kori, Shinka, Tainan, Taito, Karenko. Japan, China, India, Sumatra, Philippine, Africa.

The winged viviparous females are very few and are furnished with very short, but distinct, cornicles, a pair of large circular wax-plates on the lower side of head, a pair of smaller oval wax-plates on the mesonotum, and some rather long hairs on the side of abdomen; the 3rd antennal joint is as long as the the 5th, with about 9–12 sensoria; the 4th is short, as long as the 6th, with 2 or 3 sensoria; and the 5th is with 6–11 sensoria usually not occupying half the circumference of the joint. *Tetraneura hirsuta* Nevsky is different from my specimens in the shorter setae on the side of the apterous form.

This species may be identical with *Tetraneura fusiformis* Mats. descibed from Japan. In this connection it is added that *Tetraneura moriokensis* Monzen (syn. *Watabura moriokensis* Monzen) is a synonym of *T. nishiyae* Mats. (syn. *Watabura nishiyae* Mats.).

Genus **Eriosoma** Leach.

Eriosoma clematicola Takah.

Aphididae of Formosa, pt. 3, p. 99 (1924); Okamoto and Takahashi, Ins. Mats., I, p. 146 (1927).

Host.—Clematis gouriana, C. sp.

Distr.—Taihoku, Kusukusu. Corea.

In Corea this species produces galls on Zelkova, but in Formosa has not been found on it.

Tribe Fordini,

Key to genera.

(1) Stigma of fore wings elongated, extending some distance. .....*Melaphis.*
— Stigma not elongated, truncate on the distal end. .....(2)
(2) Antennae of the alate form 5-jointed. .....(3)
— Antennae of the alate form 6-jointed. .....(4)
(3) Secondary sensoria reticulated. .....*Formosaphis.*
— Secondary sensoria not reticulated.....*Nurudea.*
(4) Apterous form with the antennae usually 5-jointed, and many prominent setae some of which are sometimes dilated and flattened. .....*Geoica.*

— Apterous form with the antennae 6-jointed, lacking prominent setae..... ..... *Pemphigella.*

Genus **Melaphis** Walsh.

Melaphis chinensis Bell.

Aphis chinensis, Bell, Pharm. Jl., VII, p. 310 (1848) (not available).

Schlechtendalia chinensis, Lichtenstein, Stett. Ent. Zeitg., XLIV, p. 240 (1883).

Melaphis chinensis, Baker, Ent. News, XXVIII, p. 385 (1917).

Schlechtendalia miyabei, Matsumura, Coll. Essays for Nawa, Gifu, p. 62 (1917); Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 529 (1929).

Schlechtendalia mimifushi, Matsumura, Coll. Essays for Nawa, Gifu, p. 63 (1917); Monzen, Saito Ho-on Kai, Monog., I, p. 4 (1929).

Host.—Rhus semialata.

Distr.—Kinyan, Kubabo, Riyohen, Asahi, Buta. Japan, China.

Schlechtendalia intermedia Mats. is possibly a form of this species.

The secondary sensoria are linear in *Melaphis rhois* Fitch, but are ample in *M. chinensis* Bell, while they are oval and transverse, showing the intermediate shape between the above 2 species, in *M. minutus* Baker; and *Schlechtendalia* can not be separated from *Melaphis* by the shape of the sensoria. In *Agrioaphis* and several other genera, various degrees of narrowing of the sensoria are also found.

Genus **Nurudea** Mats.

Nurudea shiraii Nats.

Nurudeopsis shiraii, Matsumura, Coll. Essays for Nawa, Gifu, p. 68 (1917).

Nurudea shiraii, Takahashi, Aphididae of Formosa, pt. 1, p. 95 (1921); pt. 2, p. 151 (1923); pt. 3, p. 99 (1924).

Host.—Rhus semialata.

Distr.—Taihoku, Kanshirei, Kowaron, Nano, Kinyan, Riyohen. Japan.

Genus **Formosaphis** Takah.

Formosaphis micheliae Takah.

Aphididae of Formosa, pt. 4, p. 53 (1925).

Host.—Michelia longifolia.

Distr.—Taihoku.

Genus **Pemphigella** Tullg.

Pemphigella aedificator Buckt.

Pemphigus aedificator, Buckton, Ind. Mus. Notes, III, p. 72 (1893); Das, Mem. Ind. Mus., VI, p. 144 (1918).

Pemphigella aedificator, Takahashi, Kontyu, IV, p. 48 (1930).

Pemphigus cynodonti, Das, Mem. Ind. Mus., VI, p. 153 (1918).

Paracletus cynodonti, Takahashi, Aphididae of Formosa, pt. 1, p. 97 (1921); pt. 2, p. 55, p. 151 (1923).

Hosts.—Cynodon dactylon, Oplismenus sp., Pollinia ciliata.

Distr.—Taihoku, Urai, Shinten. India.

Genus **Geoica** Hart.

Geoica lucifuga Zehnt.

Tetraneura lucifuga, Zehntner, Arch. Java Suiker-Industr., V, p. 555 (1897).

Serraphis lucifuga, van der Goot, Contr. Fauna Ind. Neerl., I, 3, p. 264 (1917).

Geoica lucifuga, Takahashi, Aphididae of Formosa, pt. 1, p. 96 (1921); Nevsky, Mon. Aphid. Middle Asia, p. 391 (1929).

Hosts.—Saccharum officinarum, Cyperus sp.

Distr.—Shinka, Karenko. China, Philippine, Java, Middle Asia.

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尤 其 偉 中國蚜類問題及其解決之我見。國立中央大學農學院叢刊、No. 11 (民國 18 年)

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